



THE  
PLANT LICE OR APHIDIDAE  
OF  
GREAT BRITAIN

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## PREFACE

THIS volume is on the same lines as the first and carries the subject up to the end of the Tribe *Aphidini*, and part of the Tribe *Callipterini*.

My thanks must again be expressed to Mr. F. Laing of the British Museum (N.H.) for reading the proofs and for his invaluable help and notes.

Wye Court, Wye.

August, 1927.

## ERRATA.

- p. 41, for Fig. 16 read Fig. 17.  
p. 49, line 25, for 16 read 26.  
p. 63, Fig. 25 B. is antenna of ♂ from *Azolla* with fewer sensoria on iii.  
p. 80, line 27, p. 83, line 33 and p. 88, line 19, for *newtonii* read *newtoni*.  
p. 87, line 34, for 30-32 read 30-52.  
p. 89, line 33, for 13 read 17.  
p. 90, line 29, for *dallmanii* read *dallmani*.  
p. 101, Fig. 38 E. for alate ♀ read alate ♂.  
p. 119, line 11, for 30-32 read 30-52.  
p. 141, line 8, for *malvearum* read *malvacearum*.  
p. 153, Fig. 66 C. for alate ♀ read alate ♂.  
p. 154, line 4, for 25 read 15.  
p. 160, line 21, for 13 read 17.  
p. 195, line 21, for 25 read 15.  
p. 196, line 35, for 8 read 6.  
p. 206, line 16, for 14 read 28.  
p. 239, line 9, for 3-14 read 3-26.  
p. 265, line 8, for 2 read 12.  
p. 268, line 11, for 2-4 read 2-6; and p. 227, line 2, for 0-4 read 2-6.  
p. 356, Fig. 164 add H. antenna of ♂.  
p. 368, line 34, for 13 read 11.  
p. 373, line 29, for 22 read 15.

# Sub-tribe APHIDINA.

The following genera of this sub-tribe occur in Great Britain : *Aphis* Linnæus ; *Anuraphis* Del Guercio ; *Aphidiella* Theobald ; *Cavariella* Del Guercio ; *Hyalopterus* Koch ; *Cryptosiphum* Buckton ; *Pergandeida* Schouteden ; *Longicaudus* V. d. Goot ; *Liosomaphis* Walker ; *Brevicoryne* V. d. Goot ; *Hyadaphis* Kirkaldy ; *Rhopalosiphum* Koch ; *Brachycolus* Buckton ; *Toxoptera* Rondani and *Aspidaphis* Gillette. Van der Goot's *Acaudus* is sunk under *Anuraphis* and for a species with completely hidden cauda, a new genus *Neoacaudus* is created. The insects in this sub-tribe show great variation in the cornicles, cauda and bionomics. The chief characters are: no frontal and antennal tubercles or lobes ; cornicles never truncate, however small ; cauda never knobbed. Cornicles vary from almost pores to long tubes, more or less cylindrical or swollen. Cauda very long (*Longicaudus*) or scarcely visible (*Neoacaudus*). Most

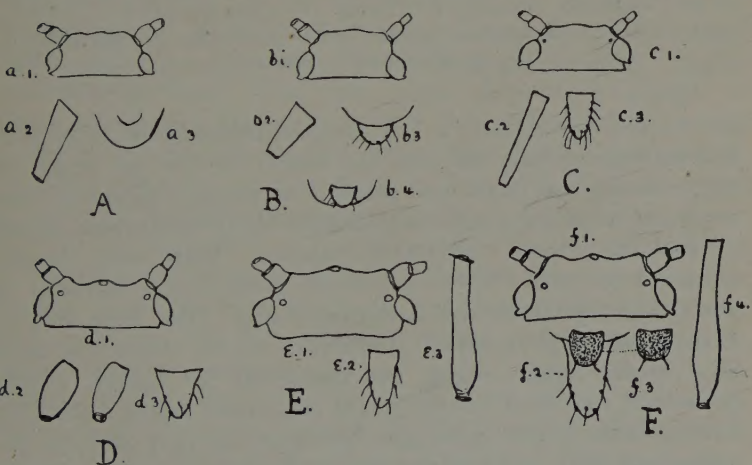


Fig. 1.

A. *Neoacaudus* nov-gen. ; B. *Anuraphis* ; C. *Aphis* ; D. *Brevicoryne* ; E. *Rhopalosiphum* ; F. *Cavariella*. A.-D. a<sup>1</sup>. head ; a<sup>2</sup>. cornicle ; a<sup>3</sup>. cauda and anal plate. E. e<sup>1</sup>. head ; e<sup>2</sup>. cauda ; e<sup>3</sup>. cornicle ; F. f<sup>1</sup>. head ; f<sup>2</sup>. cauda ; f<sup>3</sup>. supra-caudal process ; f<sup>4</sup>. cornicle.



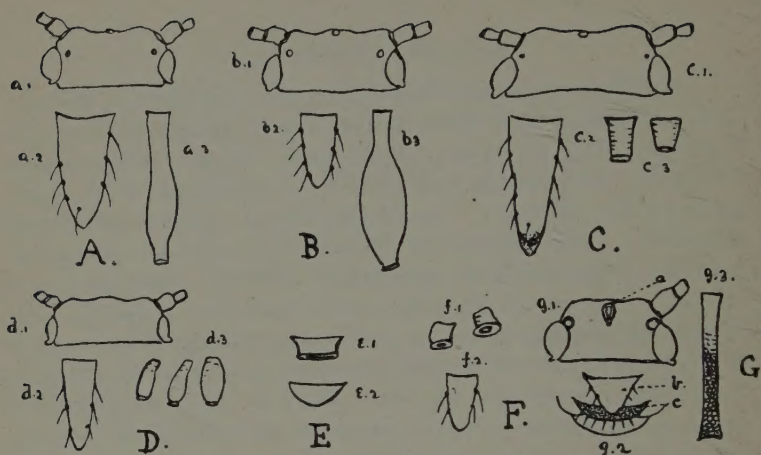


Fig. 2.

A. *Hyadaphis*; B. *Liosomaphis*; C. *Pergandeida*; D. *Hyalopterus*; E. *Cryptosiphum*; F. *Brachycolus*; G. *Aphidiella*; A.-C. Heads  $a^1$ , cornicles  $a^3$  and Cauda  $a^2$ . D. head  $d^1$ ; cauda  $d^2$ ; cornicles  $d^3$ ; E. cornicle  $e^1$ ; cauda  $e^2$ ; F. cornicles  $f^1$ ; cauda  $f^2$ ; G.  $g^1$  head;  $g^2$  anal plate (c), cauda (b);  $g^3$  cornicle.

species are free living; a few produce pseudo-galls, especially leaf-curling. Nearly all pass the winter in the egg stage, on trees, shrubs and herbs and migrate in summer to annual and perennial herbs as a rule and back to the primary host plants in autumn. Some are subterranean. Many are largely attended by ants. There are many species very harmful to our fruit, vegetables and flowering plants. The Blue Bug or Rosy Apple Aphid called *Anuraphis roseus* Baker, is often fatal to the Apple crop; the Black Fly or Collier (*Aphis rumicis*) is too often destructive to our Broad Beans; the Leaf Curling Plum Aphid (*Anuraphis helichrysi*) not only destroys the foliage and fruit, but kills the wood; the subterranean *A. tulipæ*, Boyer causes much loss to bulb growers; the Green Apple Aphid (*A. pomi*) spoils much young Apple, Pear and Quince stock. Many others also do damage in the open and under glass.

The key to the genera is in Vol. I., pp. 37 and 38.

## Genus CAVARIELLA Del Guercio.

*Corynosiphon* Mordwilko.*Nipposiphum* Matsumura.

Del Guercio, Redia VII., 323 (1911); Mordwilko, Faune d. l. Russ., Ins. Aphidodea, 73 (1914); Matsumura, Journ. Coll. Agri., Tohoku. Univ., VII., 410 (1917).

Head without frontal tubercles. Antennæ of 6 segments, shorter than body, with prominent round sensoria in alata, especially on segment iii., giving a tuberculate appearance. Cornicles usually somewhat swollen near distal end, irregular in form, moderately long, much longer than cauda. Cauda rather long, more or less conical; a *prominent supra-caudal process* in all stages, most prominent in the apteræ. Males alate. Oviparous females apterous.

Type species (of Del Guercio) the *pastinacæ* of Linnæus. Mordwilko refers *capreæ* as the type of his genus *Corynosiphon*, both species are very closely allied, so that his genus sinks under *Cavariella*. The *Nipposiphum* of Matsumura is apparently the same as *Cavariella*. So far I have found four species in Great Britain coming in this genus, namely *Aphis capreæ* Fabricius; *Aphis pastinacæ* Linnæus; *Aphis ægopodii* Scopoli; *Aphis umbellatarum* Koch. The first three have been placed in Passerini's genus *Siphocoryne* 1863 (not 1860) but as shown elsewhere this genus is invalid. Schouteden and others have sunk Scopoli's *ægopodii*. I find that the Aphid on *Ægopodium* fits in well with Scopoli's description and that it differs from *capreæ*, so I have reinstated it. The *Siphocoryne fœniculi* of Passerini as identified by Buckton, who says it differs from *capreæ* in the absence of a little horn above the tail, cannot, of course, come in this genus. His figures and descriptions, however, exactly agree with the commonest Fennel aphid in this country. Del Guercio (Redia, VII., 331, 1911) places Passerini's *fœniculi* in *Siphocoryne*, and as he founded *Cavariella* largely on the supra-caudal process he would not have done this. The commonest Fennel Aphid is a *Cavariella*, and I cannot separate it from *ægopodii*. Del Guercio also places Koch's *Rhopalosiphum cicutæ* in *Cavariella*; I have never seen this insect. Del Guercio also describes a *Cavariella gigliolii* (Redia, VII., 326) from *Angelica sylvestris* from Portugal. I have received a *Cavariella* from North



Wales on the same plant, which answers Del Guercio's description, but on comparison I cannot separate it from *capreæ*. Koch's *Aphis umbellatarum* undoubtedly comes here.

# KEY TO BRITISH SPECIES.

## *Alate viviparous females.*

### 1. Cornicles more or less clavate.

A. Supra-caudal process triangulate.

B. Antennal segment vi. longer than iv. + v. ; flagellum much longer than base. *capreæ*.

BB. Antennal segment vi. about as long as iv. + v ; flagellum very little longer than base. *ægopodii*.

AA. Supra-caudal process knobbed ; flagellum much longer than base. *pastinacæ*.

### 2. Cornicles cylindrical.

*umbellatarum*.

## *Apterous viviparous females.*

### 1. Cornicles clavate.

A. Supra-caudal process blunt, not knob-like ; flagellum longer than base. *capreæ*.

Flagellum as long as base. *ægopodii*.

AA. Supra-caudal process knob-like. *pastinacæ*.

### 2. Cornicles cylindrical.

*umbellatarum*.

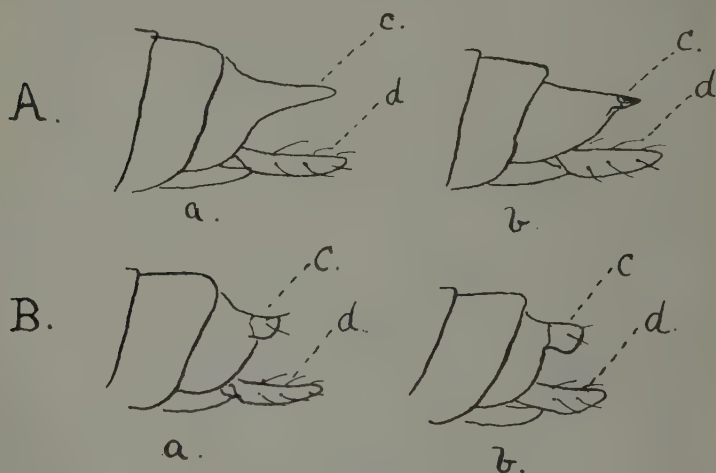


Fig. 3.

A. *Cavariella capreæ*; Apex of apterous ♀ (a) and b. of alate ♀; B. of *Cavariella pastinacæ*; c. Supra-caudal process; d. Cauda.

FOOD PLANTS OF *Cavariella*.

<i>Angelica atropurpurea</i>	C. capreæ.
„ <i>sylvestris</i>	C. capreæ.
<i>Ægopodium podagraria</i>	C. ægopodii.
<i>Ænanthe crocata</i>	C. capreæ.
<i>Carum carum</i>	C. capreæ.
<i>Conium maculatum</i>	C. capreæ.
<i>Caucalis anthriscus</i>	C. capreæ.
<i>Chærophyllum temulum</i>	C. capreæ.
<i>Erysimum vulgare</i>	C. capreæ.
<i>Feniculum vulgare</i>	C. ægopodii.
<i>Glaucium luteum</i>	C. umbellatarum.
<i>Heracleum spondylium</i>	C. capreæ.
„ „	C. umbellatarum.
<i>Ligusticum porteri</i>	C. capreæ.
<i>Liatris gummifera</i>	C. capreæ.
<i>Pteroselinum hortense</i>	C. capreæ.
<i>Pastinaca sativa</i>	C. pastinacæ.
<i>Populus spp.</i>	C. capreæ.
<i>Salix amygdalina</i>	C. capreæ.
<i>Salix alba</i>	C. capreæ.
„ <i>alba</i>	C. pastinacæ.
„ <i>babylonica</i>	C. capreæ.
„ <i>babylonica</i>	C. pastinacæ.
„ <i>capreæ</i>	C. capreæ.
„ <i>capreæ</i>	C. pastinacæ.
„ <i>capreæ</i>	C. ægopodii.
„ <i>capreæ</i>	C. umbellatarum.
„ <i>fragilis</i>	C. ægopodii.
„ <i>nigra</i>	C. capreæ.
„ <i>lurida</i>	C. capreæ.
<i>Sium</i>	C. ægopodii.
<i>Zizca aurea</i>	C. capreæ.

## CAVARIELLA CAPREÆ Fabricius.

*Aphis capreæ* Fabricius.*Cinara capreæ* Mosley.*Rhopalosiphum capreæ* Koch.*Siphocoryne capreæ* Passerini, Buckton.

- Hyadaphis capreae* Kirkaldy, Schouteden.  
*Hyadaphis pastinacæ* Schouteden, Davis, Gillette  
 (non Linn.).  
*Rhopalosiphum salicis* Monell.  
*Hyadaphis salicis* Weed.  
*Siphocoryne archangelicæ* Oestlund.  
*Cavariella gigliolii* Del Guercio.

Fabricius, Syst. Ent., 217, 33 (1775); Ent. Syst. IV., 221-3 (1794); Sp. Ins., II., 384, 2 (1781); Mant. Ins., II., 315, 3 (1787); Syst. Rhyng., 294, 3 (1803); Schrank, Fn. Boica, II., 104, 1179 (1801); Kaltenbach, Mono. Pflanz., I., 109, 84 (1843); Koch, Die Pflanz, 37-8, pl. VII., figs. 46, 47 (1854); Ratzburg, Forst. Ins., III., 218, 12 (1844); Walker, Ann. Nat. Hist. Se. 2, IV., 195, 203, 71 (part) (1849); Zoologist, VII., App. IV. (1849); List. Homop. (B.M.), IV., 980 (1852) (part); Gmelin, Ed. Syst. Nat., I., 2203, 41 (1788); Mosley, Gard. Chron., I., 748 (1860); Passerini, Aphid. Ital., 52, n. 1 (1863); Amyot, Ann. Soc. Ent. Fr. Se. 2, V., 479 (1872); Buckton, Mono. Brit. Aphid, II., 271, pl. XLV. (1877); Ferrari, Sp. Aph. Liguriæ, 231, 26 (1872); Monell, Bull. U.S. Geolog. and Geog. Survey, V., 1, 26 (1879); Oestlund, Aph. Minn., 70 (1887); Schouteden, Cat. Aph. Belg., 229 (1906); Weed, Trans. Amer. Ent. Soc., XX., 297 (1893); Davis, Journ. Eco. Ent., III., 6, 493 (1910); Williams, Aphid. Nebraska Univ. Stud., X., 2 (1910); Gillette, Journ. Eco. Ent., IV., 3, 320 (1911); Del Guercio, Redia, VII., 326 (1911); Theobald, Entomologist, XLIV., 18 (1911); Theobald, List. Aphid. Hastings, 8 (1912) (part); Davis, Aphid. Nebraska Neb. Univ. Stud., XI., 3, 22 (1912); Theobald, Rept. Eco. Zool. for 1912, 87 (1913); Willcocks, Sult. Agri. Soc., Bull. I., 138 (1922); Glendenning, Proc. Ent. Soc. Brit. Columbia, No. 21, 41 (1924).

*Alate viviparous female.* Head dark olive green to almost black; band on pronotum, thoracic lobes and scutellum black. Abdomen green to yellow-green, with 4 deep olive-green transverse bars, which in some specimens merge into a solid mass. Antennæ shorter than body, black. Cornicles irregularly clavate, long, green, dusky on apical half; supra-caudal process dark, short and bluntly triangular, with two unequal hairs at apex. Cauda moderate, deep green, nearly half length of cornicles. Antennæ

with segment i. larger than ii., iii. longest, with many sensoria over the whole length; iv. and v. nearly equal; v. if anything slightly shorter than iv.; flagellum as long as iv. + v. Rostrum reaches to 2nd coxæ or just beyond; black at apex. Legs green with large dusky area at apices of tibiæ; tarsi dusky. Stigma and veins brown.

Length 2 to 2.3 mm.

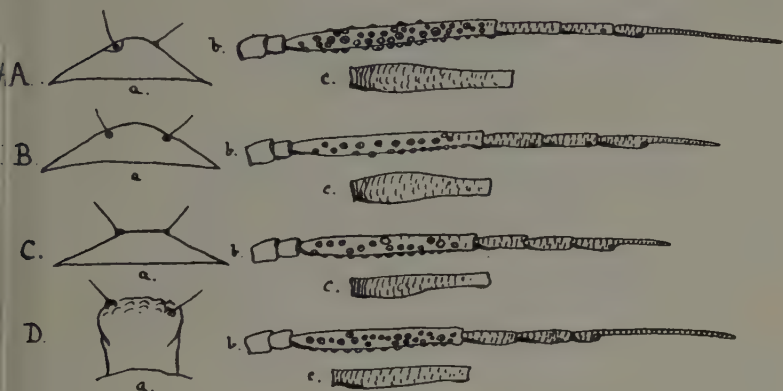


Fig. 4.

A. *Cavariella capreæ* F. alate ♀; B. *C. ægopodii* Scop.; C. *C. ægopodii* var.; D. *Cavariella pastinacæ* Linn.; B. antennæ; c. cornicles (alate ♀♀).

*Apterous viviparous female.* Green; eyes black; antennal segments v. and vi. dusky; iii. longest; iv. slightly longer than v.; v. slightly longer than basal area of vi.; flagellum rather short, about equal to segments iv. + v. Antennæ about half length of body. Cornicles green, about as long as antennal segment iii., less clavate than in alate form. Supra-caudal process green, long and blunt, with 2 terminal chætæ; not quite so long as the green cauda.

Length 2 to 2.3 mm.

*Oviparous female?* (Walker). "Apterous, elliptical, flat, dark reddish; antennæ pale with dusky apices; nectaries pale with dusky tips; legs pale, tips of tibiæ and the tarsi dusky; hind tibiæ broadened and dusky grey to black. Some assume a greenish hue, others yellowish." Walker describes a bright red variety with the disc of the abdomen black; another with almost white

head ; another orange and another dull yellowish-green, with a broad irregular black stripe along the chest, where it divides and passes along each side of the abdomen. The latter is, I fancy, the oviparous female of *Chaitophorus capreae*.

*The Male ?* (Walker). "Winged ; body small and black ; abdomen dark brown ; antennæ black, thick from their base till near their tips and nearly as long as the body ; cornicles black, about one-sixth length of body. Legs black, shanks except their tips yellow. Wings colourless and much longer than the body, wing ribs and rib-veins yellow ; the brands and other veins brown."

Walker describes several varieties which may or may not belong to this species. One with the abdomen dark red beneath and the body covered with white powder and another with the abdomen dark yellow and the nectaries as long as the body ; a third pale yellowish-green.

FOOD PLANTS. *Salix capreae* ; *S. pentandra* ; *S. alba* ; *S. babylonica* ; *S. amygdalina* ; *S. lurida* ; *S. nigra* ; *Ænāthe crocata* ; *Heracleum spondylium* ; *Pastinaca sativa* ; *Conium maculatum* ; *Chærophyllum temulum* ; *Ægopodium podagraria* ; *Angelica atropurpurea* ; *Petroselinum hortense* ; *Carum carum* ; *Ligusticum porteri* ; *Zizea aurea* ; *Liatris gummiferae* ; *Erysimum vulgare* ; *Populus* ; *Caucalis anthriscus* ; Chervil.

LOCALITIES. Widely spread over England and Wales ; a few records from Scotland ; Coniston, Edinburgh, 15 vii. 22 (Evans) ; Borrisokane, N. Tipperary, Ireland, 28 iv. 24 (Stelfox). Common throughout all N.E. counties of Scotland and Argyleshire (Laing). France (F.V.T.) ; Belgium (Schouteden) ; Bergen, Norway (F.V.T.) ; Germany ; North America (Davis, Williams, etc.) ; British Columbia (Glendenning) ; Bogota (F.V.T.) ; Egypt (Willcocks).

*Observations.* A very marked species easily told by the long flagellum of the antennæ and the supra-caudal process, which is small in the alate female, but large in the apteræ. It lives in autumn as sexuales on various species of *Salix* and is especially fond, I find, of Goat Willow (*Salix capreae*). The black ova are laid in the axils of the buds and on young wood. They hatch early in April and asexual reproduction goes on upon *Salix* until

the end of May and a few into June. From the end of May until July, alatae appear and fly off to various *Umbelliferae*. Schouteden and some other authors place Scopoli's *Aphis ægopodii* as a synonym; it seems to me to be distinct. Kaltenbach considered Koch's *Rhopalosiphum pastinacæ* as the same, but I agree with Buckton in considering it distinct as shown here and Linnæus' *Aphis pastinacæ* is also distinct. Davis and others mention and figure *capreæ* under the name of *pastinacæ* (Journ. Eco. Ent., III., 493, figs. 20 and 21, pl. XXXII.). The species described by Monell (Bull. U.S. Geol. and Geog. Surv., V., 1. 26, 27, 1879) as *Rhopalosiphum salicis* appear to be this species. Weed refers to the same as *Hyadaphis salicis* (Trans. Am. Ent. Soc., XX., 297, 1893). Oestlund considers his species *archangelicæ* to be the same as Monell's *salicis*, so I have included it here. (Vide Davis, Journ. Eco. Ent., IV., 330, 1911.) Gillette describes this insect, but the species he separates as *pastinacæ* is not the European species. The sexual forms have been found in England by Walker and by Weed in America on *Salix*. Walker's description may apply to *capreæ*, *pastinacæ* and *ægopodii*; he describes no less than seventeen varieties of apteræ and twenty-two of alate females. It often occurs in such numbers that the tips of osiers and willows are killed. It also swarms on the seed heads of the

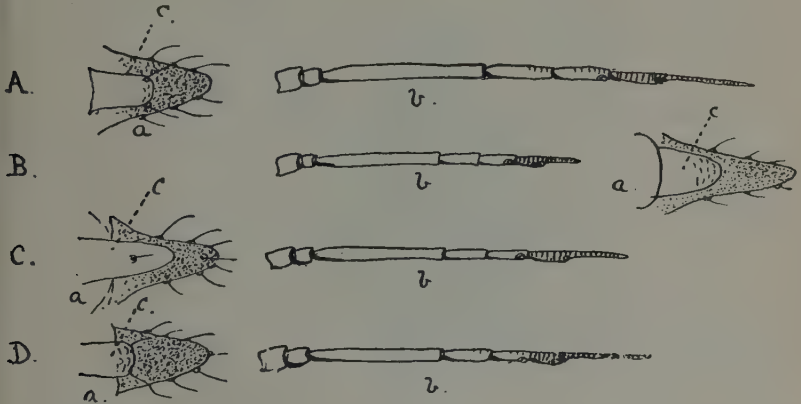


Fig. 5.

A. *Cavariella capreæ* Fab.; B. *Cavariella ægopodii* Scop. (larva); C. *Cavariella ægopodii* Scop.; D. *Cavariella pastinacæ* Linn.; a. Cauda; c. Supra-caudal process; b. Antennæ (apterous ♀♀)

Carrot and Parsnip and much reduces the seed crop. In my paper on Willow Aphides (Rep. Eco. Zool., 1913) I confused *capreæ* and *ægopodii* (fig. 25 refers to the latter).

CAVARIELLA ÆGOPODII Scopoli.

*Aphis ægopodii* Scopoli.

*Aphis podograria* Schrank.

Scopoli, Ent. Carn., 399 (1763) ; Fabricius, Sp. Ins., II., 387, 28 (1781) ; Mant. Ins., II., 316, 33 (1787) ; Schrank, Fn. Boica, 110 (1801) ; Theobald, Rept. Eco. Zool. for 1912, 88 (part), 1913 ;



Fig. 6.—Alate Female of *Cavariella ægopodii* Scopoli.  
(Magnified fourteen times.)



Fig. 7.—*Cavariella ægopodii* Scopoli.  
Apterous ♀ (greatly enlarged).



Theobald, Bull. Soc. Roy. Ent. d'Egypt, VII., 44 (1922); Hall, Notes Aphididæ, Egypt, 27 (1926).

*Alate viviparous female.* Very like *capreæ* but antennal segments iv., v. and base of vi. are equal in length and the flagellum is only a little longer than basal portion; the sensoria on iii. are fewer in number (18-25) and the antennæ are relatively shorter. The cauda is dusky. Supra-caudal process very like *capreæ*. Cornicles clavate, dusky, about twice as long as the cauda and two-thirds as long as antennal segment iii.

*Length* 2 to 2.2 mm.

*Apterous viviparous female.* Green all over; eyes red and black. Antennæ about half length of body; segments iv. and v. equal; the two parts of vi. each about same length as iv. and v. Supra-caudal process bluntly cone shaped.

*Length* 2 mm.

*Stem Mother.* Antennæ very short, about as long as head and thorax, of 6 segments, some appearing of only 5; i. much larger than ii., iii. about three times length of iv., iv. and v. equal; base

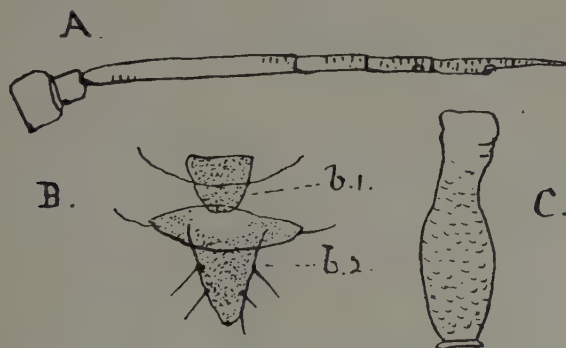


Fig. 8.—*Cavariella ægopodii* Stem Mother.

A. Antennæ; B. Cauda b 2, and supra-caudal process b 1; C. Cornicle.

of vi. equals v.; flagellum slightly longer than base. Rostrum thick, reaches second coxæ. Cornicles thick, swelling apically, about equal to antennal segments iii. and iv. Cauda one-third of cornicles, thick, bluntly pointed; hairs few and faint. Supra-caudal process shorter than cauda, thick, blunt, about same shape. Legs thick, especially femora.

*Length* 1.5 mm.

*Oviparous female.* Green. Antennæ very short, about  $1\frac{1}{2}$  times length of head ; dark except base of segment iii. ; i. wider but no longer than ii. : iii. longest, longer than iv. + v. ; iv. a little longer than v. ; base and flagellum of vi. equal, each about equal to v. Rostrum to second coxæ or just past. Cornicles long, as long as iii. + iv., slightly and irregularly swollen on apical half, narrow. Cauda very broad and cone shaped, hairs 3 each side and 2-3 apical. Anal plate dark, rounded. Supra-caudal process very dark, much smaller than cauda, 2 apical lateral hairs. Legs short ; first and second pair same colour as body, apices of tibiæ dark ; third pair all dark ; tibiæ swollen, with many sensoria except just at base and apex.

FOOD PLANTS. *Ægopodium podagraria* ; *Fœniculum vulgare* ; *Salix fragilis* and *Salix* sp. ?

LOCALITIES. London area, 6. vi. 12 ; Wye, 10. ix. 14 ; Tonbridge, 7. vi. 13 ; Sevenoaks, 2. vi. 13 ; Abingdon, vii. 15 (F.V.T.) ; Washford, Oxford, 26. iv. 25 (O. W. Richards), Ross, vi. 13 (F.V.T.), Putney Heath, xi. 20 (Donisthorpe) ; Egypt (Theobald, Hall).

*Observations.* A number of Aphides sent me in 1912 by Mr. Rogers, late of the Board of Agriculture, swarming on *Ægopodium podagraria*, were recorded as *capreæ*, Schouteden and others having placed Scopoli's species as a synonym of it. I find that it is distinct, the chief differences being in the antennæ, which are much shorter than in *capreæ*, notably in the apterous females and the alate female has many fewer sensoria on iii. and the flagellum is much shorter. The oviparous female is described from a slide sent me by Mr. F. Laing, the two specimens taken by Mr. H. Donisthorpe on a seat on Putney Heath. Schrank's *podagraria* may be the same. In my paper on Willow Aphides I included this species with *capreæ* ; fig. 25 is really of this insect. It winters on *Salix*, the stem mother being found in April and in June they become alate and fly away to certain Umbelliferae. I have found it swarming on the garden Fennel and it frequently becomes a serious pest. Two slides in Walker collection named *capreæ* are *ægopodii*.

CAVARIELLA PASTINACÆ Linnæus (non Gillette and Essig).

*Aphis pastinacæ* Linnæus.

*Siphocoryne pastinacæ* Passerini.

*Aphis capreæ* Walker (part).

*Hyadaphis pastinacæ* Kirkaldy.

*Siphocoryne capreæ* Schouteden (part).

*Siphocoryne archangelicæ* Oestlund ?

Linnæus, Syst. Nat., I., 734 (1767) ; Syst. Ent., II., 1, 36, 31 (1775) ; Fn. Suec. 977 (1746) ; Fabricius, Mant. Ins., II, 315, 13 (1787) ; Ent. Syst., IV., 213, 13 (1794) ; Kaltenbach, Mono. Pflanz., 109 (1843) ; Walker, List. Homop., IV., 980, 99 (1852) ; Monell, Bull. U.S. Geol. Surv., V., 26 (1879 ?) ; Thomas, 8th Rept. Ent., III., 84 (1880) ; Cockerell, Trans. Amer. Ent., Soc., XXIX., 114 (1903) ; Oestlund, Aphid. Minn., 70 (1887) ; Riley-Howard, Insect Life, IV., 213 (1891) ; Schouteden, Ann. Soc. Ent. Belg., XLVII., 179 (1903) ; Kirkaldy, Entomo., XXXVII., 279 (1904) ; Williams, Aphid Nebraska, 62 (1910) ; Davis, Journ. Eco. Ent., III., 493 (1910) ; Gillette, Journ. Eco. Ent., IV., 3, 34 (1911) ; Essig, Pomona Journ. Ent., III., 3, 534, figs. 174, 175 (1911) ; Del Guercio, Redia, VII., 326 (1911) ; Theobald, Aphid. Hastings Dist., 8 (1912) ; Theobald, Rept. Eco. Zool. for 1912, 85 and 88 (1913) ; Glendenning, Proc. Ent. Soc. Brit. Columbia, No. 21, 41 (1924).

*Apterous viviparous female* (on *Salix*). Green ; cornicles and cauda deeper green than body, especially cauda. Eyes red. Rostrum green, apex brown. Legs green, tarsi dusky. Elongate oval in form. Antennæ short, not reaching second legs ; segment i. much larger than ii. ; iii. longest, not quite so long as iv. + v. + vi. ; iv. less than one-third of iii. ; a little longer than v. ; vi. equal to iv. + v. ; base a little longer than iv., flagellum  $1\frac{1}{2}$  times base. Rostrum reaches to or just past second coxæ. Cornicles long, clavate, nearly equal to antennal segments iii. and iv. Cauda thick, equals half length of cornicles, three hairs each side. Supra caudal process blunt and knob-like, 2 apical hairs. Legs rather short and thick, a few hairs on tibiæ. Cuticle finely shagreened.

*Length* 1.8 to 2.5 mm.

*Alate viviparous female*. Yellowish-green ; head, pronotal band and thoracic lobes black. Abdomen with a dark olive-green

dorsal patch, often broken into transverse bars. Antennæ deep brown; segment iii. much the longest, markedly tuberculate, sensoria thick along whole length; iv. and v. nearly equal; basal area of vi. small, not half length of v.; flagellum long, as long as iv. + v. and base of vi. Cauda dusky. Supra-caudal process prominent, but small and apex slightly rounded, with 2 chætæ. Cornicles dusky at apices, paler at base, clavate, rather long, twice as long as cauda and about two-thirds length of antennal segment iii. Legs with apices of tibiæ and the tarsi brown. Veins and stigma brown.

*Length* 2.5 mm.

*Apterous viviparous female* (on *Pastinaca*). Green, some transparent, oval. Antennæ short, pale, about one-third length of body; iii. longest; iv. a little longer than v.; v. as long as basal area of vi.; flagellum about as long as iv. + v. and basal area of vi. Rostrum, reaching to about second coxæ; apex black, rest green. Cornicles pale green to very pale yellowish-green, clavate and longer than antennal segment iii. Cauda prominent, apex dusky in some, all green in others. Supra-caudal process blunt as in alate female. Legs all greenish, but in a few the apices of tibiæ and the tarsi smoky.

*Length* 2 to 2.5 mm.

FOOD PLANTS. *Salix* spp.; *Pastinaca sativa*; *Daucus carota* and many wild *Umbelliferae*, including *Heracleum spondylium*; *Conium maculatum* (Rymer Roberts); *Heracleum lanatum* (Cockerell).

LOCALITIES. Great Salkeld, 13, vi. 21; (Britten); Wye, 1, viii., 11; 27, vi. 12; 4, vii., 13; Hastings, viii., 13; (F.V.T.); Windermere (Rymer Roberts); Haslemere (Buckton); Italy (Del Guercio); America (Cockerell); British Columbia (Glen-denning).

*Observations.* The original spelling of the name was *pastinacæ*, but *pastinacææ* occurs frequently in literature. This distinct species has usually been taken to be *capreæ*. The supra-caudal process at once separates it, and the antennæ also differ. There is some variation in the colour of the alatæ; the dark abdominal marks may be as one patch, or broken into bands or even absent. Gillette has apparently mistaken this species for he states that it

differs from *capreæ* in having no supra-caudal process. Buckton's slides represent *ægopodii*. Koch's *Rhopalosiphum pastinacæ* is apparently a distinct species and does not come in this genus, as it has no supra-caudal process. Buckton does not mention the supra-caudal process, his species being evidently the same as Koch's and which I find to be the summer form of *xylostei*. Schrank. *Pastinacæ* lives on *Salix* in autumn and winter and spring and like *capreæ* migrates in June to various Umbelliferæ. The only Umbelliferæ I have found it on are *Pastinaca sativa* and *Heracleum spondylium* and on a large cultivated Cow-weed. In my paper on Willow Aphides (Rep. Eco. Zool., 1912, 84-88) I had confused *Aphis saliceti* Kaltenbach and *Cavariella capreæ*. The figure of *saliceti* (24) is of *pastinacæ* and the figure of *pastinacæ* (26) is of *capreæ*. The thinner and straighter cornicles of *pastinacæ* made me confuse it with *saliceti*. Essig gives a good account of this species from America, calling it *Hyadaphis pastinacæ* and places as a synonym Scopoli's *ægopodii*, which I make distinct, also *Aphis capreæ* Fabricius which is certainly distinct, Koch's *Rhopalosiphum pastinacæ*, *R. cicutæ* and *Aphis umbellatarum* Koch, all of which are good species. He also places Monell's *Rhopalosiphum salicis* as a synonym. I have not seen this. Oestlund's *S. archangelicæ* may be the same, but as at present in America they take *capreæ* and *pastinacæ* to be the same it is difficult to say.

Essig's *Hyadaphis pastinacæ* has been renamed *essigi* by Gillette and Bragg (Canad. Ent., 50, 3, 94 (1918)).

#### CAVARIELLA UMBELLATARUM Koch.

*Aphis umbellatarum* Koch.

*Cavariella glauciphaga* Theobald.

Koch, Die Pflanzenläuse, 116, figs. 155, 156 (1854) ; Theobald, Ent. Mo. Mag., 3 Se., IX., 102, fig. 1 (1923).

*Alate viviparous female.* Rich green; head, thoracic lobes and sternum deep brown; abdomen with large dark medium area, dark bands in front of it and dark lateral spots. Antennæ, cornicles and cauda dark. Antennæ shorter than body; segment i. is larger than ii., scarcely any longer; iii. the longest, with 45 to 70 round, unequal sized sensoria over whole length, giving a marked tuberculate appearance; iv. narrower than and much less

than half of iii., with no sensoria in true *umbellatarum*, but with 1 to 2 in *glauciiphaga*, a little longer than v.; v. as long as or longer than base of vi. Cornicles cylindrical, a little shorter than antennal segments iv. + v, dark, in some paler towards apices in *glauciiphaga*; markedly imbricate, about as long as antennal segment iii. Cauda about half of cornicles, a little thicker and

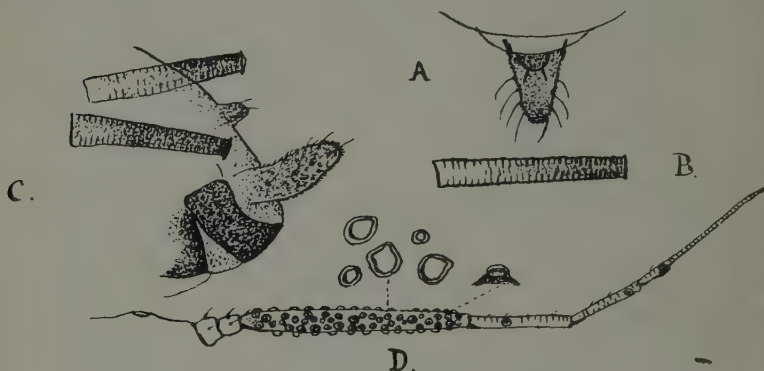


Fig. 9.—*Cavariella umbellatarum* Koch.

Alate viviparous ♀. A, cauda; B, cornicle; C, lateral view of cauda, cornicles and supra-caudal process; D, antenna.  $\times 66$ .

slightly expanded basally; 3 pairs of lateral hairs and 2 dorso-apical, in some (*glauciiphaga*) 4 and 5 on each side. Supra-caudal process small, dark, 2 apical hairs; about level with tips of cornicles. Legs with a few hairs. Wings normal.

*Length* 1.6 to 2 mm.

**FOOD PLANTS.** *Heracleum spondylium* and Yellow Horned Poppy (*Glaucium luteum*); *Salix* spp.

**LOCALITIES.** Dymchurch, Kent, 2 vi. 20; Pluckley, Kent, vi. 26 and vii. 26 (F.V.T.); Swordale 23 viii., 22 on *Heracleum spondylium*; Loch Clair, Kinlocheur, 5 viii. 22, on Sallow (D. Jackson).

**Observations.** This appears to be an uncommon species and can at once be told from other *Cavariella* by the cylindrical cornicles in both alatae and apterae. I have sunk the insects I described as *glauciiphaga* under Koch's *umbellatarum* as the differences seem to me too small. In *glauciiphaga* antennal segment iv. of the alatae has 1 to 2 sensoria, this is not seen in



Koch's species, but as one *glauciiiphaga* has none this must not be taken to be of any account ; the caudal hairs also differ, but they seem to vary in the *umbellatarum* I have.

The apteræ are green and have the same cylindrical dusky cornicles.

The only locality where I have found it to be common is Pluckley in Kent.

## Genus HYALOPTERUS Koch.

### *Hayhurstia* Del Guercio.

Koch, Mono. Pflanz. Aphid, 16 (1854) ; Buckton, Mono. Brit. Aphid., II., 109 (1877) ; Del Guercio, Redia, XX., 208 (1917) ; Schouteden, Zool. Anz., 26, 635 (1903) ; Baker, Bull. 826, U.S. Dep. Agri., 47 (1920).

Head without any frontal tubercles ; antennæ of 6 segments ; sensoria circular. Cornicles very short, not much longer than cauda, wide at base, more or less swollen beyond the middle, especially in the alatae. Cauda long and broad, longer than cornicles, with 2 hairs each side and 1 or 2 dorso-apical ones. Flagellum of antennæ longer than base. Body oval or linear ; mealy in most apteræ, also often the alatae. Some form leaf galls (*atriplicis*). Koch founded the genus in 1854, but the type (*pruni*) was set by Passerini in 1860.

The genus *Hayhurstia* created by Del Guercio has been sunk by Baker and I quite agree, in spite of the fact that the cauda of *Hayhurstia* is a little narrower and more pointed than in *Hyalopterus arundinis* ; for the differences seem to me to be very slight. Buckton's *Hyalopterus melanocephalus* also resembles the type of *Hayhurstia*, namely *atriplicis* of Linnæus.

## BRITISH SPECIES OF *Hyalopterus*.

*Hyalopterus arundinis* Fabricius.

„ *melanocephalus* Buckton.

„ *atriplicis* Linnæus.

## FOOD PLANTS OF *Hyalopterus*.

*Arundo phragmites* H. arundinis Fabr.

„ *erigyros* H. arundinis Fabr.



<i>Atriplex</i> spp.	<i>H. atriplicis</i> Linn.
<i>Calamagrostis arenarius</i>	<i>H. arundinis</i> Fabr.
<i>Chenopodium</i> spp.	<i>H. atriplicis</i> Linn.
<i>Poa annua</i>	<i>H. arundinis</i> Fabr.
<i>Phragmites communis</i>	<i>H. arundinis</i> Fabr.
<i>Prunus armenicus</i>	<i>H. arundinis</i> Fabr.
<i>Prunus domesticus</i>	<i>H. arundinis</i> Fabr.
<i>Prunus insititia</i>	<i>H. arundinis</i> Fabr.
<i>Prunus spinosus</i>	<i>H. arundinis</i> Fabr.
<i>Silene inflata</i>	<i>H. melanocephalus</i> Buck.
<i>Silene</i> sp. ?	<i>H. melanocephalus</i> Buck.

The Aphid—*Aphis eriophori* Walker was placed in this genus by Buckton. It is a very distinct *Rhopalosiphum*. The *Aphis trirhodus* Walker has also been placed here, but it is a true *Longicaudus*.

#### KEY TO BRITISH *Hyalopterus*.

##### *Alate viviparous females.*

A. Head green or dusky green.

B. Cornicles green or dusky green. Abdomen green, with 4-6 deeper median bars and 4 pairs of dark lateral spots ; antennal segment iii with 32-40 sensoria ; iv. with 5-8

*arundinis* Fab.

Abdomen green to yellow-green, with irregular darker maculations and 4 pairs of dark lateral spots ; iii. with 9-13 ; iv. with 0

*atriplicis* Linn.

AA. Head deep black.

BB. Cornicles black.

Abdomen all pale green ; iii. with 7 to 9 ; iv. with 0 ; mealy.

*melanocephalus* Buck.

##### *Apterous viviparous females.*

A. Head dusky green to green.

B. Cornicles dusky green.

Body green with darker dorsal line and darker mottlings ; mealy

*arundinis* Fab.

BB. Cornicles green, apices dark.

Abdomen green with 4-5 pairs of dusky lateral spots ; head dusky with 2 dark spots. Very mealy.

*atriplicis* Linn.

AA. Head black, blackish-grey or deep brown.

BBB. Cornicles black.

Abdomen all green, very mealy *melanocephalus* Buck.

# *HYALOPTERUS ARUNDINIS* Fabricius.\*

*Aphis pruni* Fabricius.

*Aphis arundinis* Fabricius.

*Aphis calamaphis* Amyot.

*Aphis prunifex* Amyot.

*Aphis gracilis* Walker.

*Hyalopterus pruni* Koch.

*Hyalopterus arundinis* Koch.

*Hyalopterus phragmiticola* Oestlund.

Fabricius, Sp. Ins., II., 385, 12 (1781); Mant. Ins., II., 315, 14 (1787); Ent. Syst., IV., 213, 14 (1794); Syst. Rhyng., 296, 14 (1803); Schrank, Fn. Boica, II., 115, 1217 (1801); Scopoli, Ent. Carn., 135, 406 (1763); Rossi, Fn. Etrusc., 260, 1374 (1790); Latreille, Gen. Crust, III., 173 (1802); Schmidberger, Kollar, Treat. Inj. Ins. (trans.), 284 (1840); Kaltenbach, Mono. Pflanz., I., 52, 37 (1843); Ratzburg, Forst. Ins., III., 216, 4 (1844); Walker, Ann. Nat. Hist. Se. 2, V., 388, 82 (1852); List. Homop., IV., 988, and 1040 (*gracilis*) (1852); Mosley, Gard. Chron., I., 684 (1860); Amyot, Ann. Soc. Ent. Fr., 2 Se. V., 476, 322 (1872); Buckton, Mono. Brit. Aphid, II., 110, pl. LXXV., figs. 1 to 3 (1877); Carpenter, Ins. Injurious, Ireland, in 1901, 154 (1902); Schouteden, Mém. Soc. Ent. Belg., XII., 230 (1906); Theobald, Rept. Eco. Zool., 1905-06, 54 (1906); idem 1906-07, 75 (1907); Mordwilko, Biol. Zentralblatt, 814, 815 (1907); Gillette and Taylor, Orchard Plant Lice, Bull. 134, Agri. Exp. Sta., Colorado, 13 (1908); Bull. 133, 39 (1908); Theobald, Ins. Pests of Fruit, 383-385 (1909); Davis, Journ. Eco. Ent., III., 494 (1910); Sorauer and Reh. Hand. d. Pflanzen, 671 (1913); Theobald, Bull. Ent. Res., IV., 331 (1914); Rept. Entomologist Ent. Sta., Astrakhan, 12 (1916); Blakey, Gard. Chron., 1619, I., Jan. 5 (1910); Theobald, Bull. Ent. Res., VIII., 293 (1918); Matsumura, Journ. Coll. Agri., Tohoku Imp. Univ., VII., pt. 6, 358 (1917); *arundinis* Fabricius, Sp. Ins., 385, 7 (1781); Mant. Ins., II., 315, 8 (1787); Syst. Rhyng., 295, 8 (1803); Kaltenbach, Mono.

\* Reaumur figures this Aphid (Mem. Hist. Ins., pl. 23, fig. 9).

Pflanz., I., 54, 38 (1843); Koch, Die Pflanz., 21, figs. 27, 28 (1854); Buckton, Mono. Brit. Aphid. II., pl. LXXV., figs. 4 and 5 (1877); Schouteden, Mem. Soc. Ent. Belg., XII., 230 (1906); Osborn-Surrine, Aphides, 236 (1893); Passerini, Aphid. Ital., 27 (1863); Blakey, Gard. Chron., Jan. 5, 1, 2, figs. 1-5 (1918); Das, Aphid. Lahore Mem. Ind. Mus., VI., 225 (1918); Willcocks, Sult. Agri. Soc. Bull., I. (1922); Glendenning, Proc. Ent. Soc. Brit. Columbia, No. 21, 41 (1924); Bull Soc. Roy. Ent. d'Egypte, IV., II., 23 (1916); Hall, Aphid. Egypt, 30 (1926); Takahashi, Aphid Formosa, Rept. 16. Dep. Agri. Gov. Res. Inst., 113 (1923), and Pt. 4, 57 (1925); *phragmiticola*, Oestlund, Aphid. Minn., 44 (1886).

*Apterous viviparous female.* Pale green with darker green mottling and usually a darker dorsal irregular line; rather elongate oval, covered with white meal. Antennæ shorter than body, green; in some dusky from segment iv., others only dusky on vi.; i. broader than ii.; iii. about as long as vi., longer than iv.; iv. a little longer than v. Cornicles small, about one-third length of cauda, tips not flared, dark. Cauda green, rather long, 2 lateral hairs each side and one median dorso-apical one. Legs green; tarsi dusky. Rostrum pale green, apex dusky, reaching to or nearly to second coxæ, rather thick.

*Length* 2 to 2.5 mm.

*Alate viviparous female.* Head green, with two dark marks. Thorax green; pronotum deep olive green; thoracic lobes deep olive green to brown. Abdomen green, with 4 to 6 deeper green median transverse bars, sometimes almost linear, at others flatly triangulate. Antennæ shorter than body, green, apices dusky, now and then almost all brown; segment i. broader than ii.; iii. about as long as vi. with sensoria all over it, varying from 32 to 40 in number, longer than iv., which has 5 to 8 sensoria; iv. a little longer than v., vi. with moderately long flagellum, at least twice as long as basal area. Cornicles green to deep greenish-brown; very small, somewhat constricted at base, always much shorter than cauda, a few striæ at apices. Cauda yellow to deep green, with two pairs of lateral hairs and 1 median dorso-apical one; in some 3 pairs of lateral hairs. Legs pale green, in some tarsi dusky. Wing insertions yellowish; stigma and cubitus

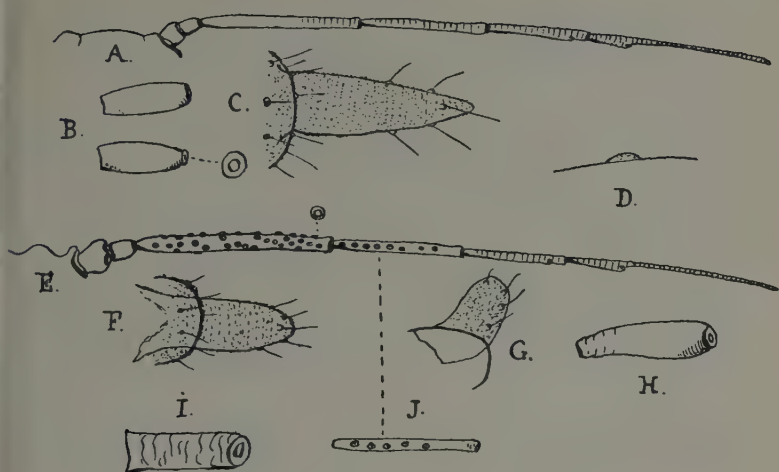


Fig. 10.—*Hyalapterus arundinis* Fabricius.

A.B.C., Antenna, cornicles and cauda of apterous ♀; D. Lateral papilla; E. antenna; F.G. cauda; H. cornicle, Alate ♀; I. cornicle; J. antennal segment iii, from *Arundo*.

yellowish-brown; veins brownish; rostrum pale, short and rather thick, reaching nearly to second coxæ.

Length 1.8 to 2 mm.

*Oviparous female.* Walker describes this as follows:—"The body is small, slender, nearly linear, rather flat, smooth, whitish-green tinged with yellow, not shining; there is a dark green stripe along the back; the head is yellow; the feelers are black, pale yellow at the base and about half length of the body; the eyes are dark red; the mouth and the nectaries are pale yellow with black tips, and the latter are hardly one-tenth of the length of the body; the legs are pale yellow and rather short; the knees, the feet and the tips of the shanks are black."

He describes two varieties, one with "The body green; the eyes nearly black"; the second with "The back of the body with a bluish tinge. On *Salsola kali* in the beginning of October near Fleetwood." This probably refers to quite a distinct species.

Blakey states that the oviparous females are "dirty sulphur colour, with a light green band down the back."

Willcocks sends me a note that they are yellowish-green.

*The Male.* Walker describes the male as being like the oviparous female but smaller ; the feelers are about half the length of the body. Length of body  $\frac{1}{2}$ - $\frac{3}{4}$  line ; of wings  $2\frac{1}{4}$  lines.

FOOD PLANTS. *Prunus domesticus* ; *P. spinosus* ; *P. insititiæ* ; *P. armeniacus* ; *P. persicæ* ; *Arundo phragmites*\* ; *A. epigyrostris*† ; *A. donax* ; *Calamagrostis arenarius* ; *Phragmites kiski* ; *Poa annua* ; *Salsola kali* (?) ; *Salix* (Walker).

LOCALITIES. Common and widely spread over Great Britain ; Narvan, Ireland (Carpenter) ; all over Europe ; America ; Agazzic, British Columbia (Glendenning) ; Egypt ; India (Das) ; Formosa (Takahashi) ; Tokyo and Sapporo, Japan (Matsumura and Takahashi) ; Astrakhan, etc.

*Observations.* This species is commonly called the Mealy Plum Aphid and has been named in economic writings as *Hyalopterus pruni*. The specific name *arundinis* has line priority.



Fig. 11.—*Hyalopterus arundinis* Fabricius.  
On leaf of Plum.

\* Also called *Phragmites communis*.

† Also called *Calamagrostes epigeios*.

Often a serious pest, now and again occurring on all kinds of cultivated plums in vast numbers, frequently so tightly packed together under the leaves that none of the surface can be seen, the whole being covered by a mealy mass. They not only suck the sap of the leaves, which do not as a rule curl, but they spread up the stems and now and then kill the top growths and worse still they form a copious honey dew, which falls on the leaves and fruit, coating them with a gummy mass, upon which a black soot fungus soon develops and then the fruit is spoilt for market. In certain years it is looked upon as one of the most serious plum pests, especially in Worcestershire and Herefordshire, and I have had many complaints from Kent, Surrey and Hampshire. It is worst on Victoria and Czar Plums, but may do damage to Pershore, various Gages and Damsons. It has also been reported to me as very harmful to Peaches and Apricots. I have observed it swarming on Sloes and Wild Bullace. In Italy it has been found attacking the Vine. Fabricius described an Aphid on Reeds under the name *arundinis*. This was taken to be distinct for many years. Buckton and Schouteden placed it as a distinct species. It is now known to be the same as *pruni*. This species winters on Plums, etc., and may be found on them in the egg stage. The ova are laid at any time between October and November or possibly well into December in Scotland. The eggs are few in number and the "Mother Queens" that come from them in spring produce but few young, then they may rapidly increase and in June and July many alatae appear. In 1913 alatae were sent me on June 17th from Woodbridge on Apricots. These alatae fly away, some to settle on other Plums, others fly to reeds and various water grasses and set up strong colonies of apterae, on these plants two or more generations may occur and then return migrants appear and fly back to the Prunes. I have followed these migrations in some years in which such vast numbers of *pruni-arundinis* have occurred on the water grasses that they were killed by them. When these vast swarms appear, parasitic, and predaceous insects so reduce this species that but few fly back to the Plums. But the few seem to be most fertile and they produce great numbers of lice, which go on breeding on the Plums, viviparously, as late as November in Scotland and then sexuales are produced. On the other hand we may find *arundinis* in numbers on *Arundo* and *Poa* in May and June, pointing to its



having over wintered there. Blakey has also shown that the Mealy Plum Aphid may complete its yearly cycle on the Plum. Walker found oviparous females on *Calamagrostis arenarius*, and pointed out first that *arundinis* and *pruni* were one and the same. Then Buckton and others separated them again. De Geer stated that he found this Aphid on Apricot and described both male and apterous female and in September he found an egg with a woolly coating fixed near a leaf bud. These ova have been more recently found by Blakey and he describes them as follows: "At the time of deposition they are soft and flexible, the skin translucent olive-green, over which a coat of silvery-looking substance, that when examined by the microscope, is found to be composed of little white looking rods. After being exposed to the air for some time the eggs assumed a more rigid character." He then says, "Considering that the eggs are laid so early in the autumn and hatched so late in spring I would suggest that this species is not so hardy as some others. It will be observed that the eggs are dormant on the trees for seven months in the year." This is, of course, an error, for I have had alatae from Scotland in November and no sexuales until December, showing a very virile and hardy species and the ova hatch early in May or April, that is rather less time in the egg stage than often occurs, amongst the majority of Aphides. The ova on Plum and Apricot may be laid either on the year's growth indiscriminately or at the base of a bud. Mr. F. Willcocks tells me it also migrates between Plum and Apricot and Rushes in Egypt. This migration is also well known in America. In the Report on the work of the Entomological Station for 1915, of Astrakhan, 12 pp., 1916, this Aphid is stated to have been present in large numbers on Plums, Apricots, Peaches and Blackthorn and migrated to *Phragmites* on May 29th first of all. The species is subject to a good deal of variation when on reeds, the colour instead of being green is often pink, others pale pinkish-brown, others almost yellow. The only structural differences I can see are that the alatae leaving the Rushes, etc., have 4 to 5 sensoria on antennal segment iv., whilst the alatae arising on the Plums have usually 7 on that segment. The colour of the cornicles varies in both, in some green, in other almost black. The only marked colour differences between alate females of *arundinis* and *pruni* are that the head and thorax are much darker in the former and the cauda of the apterae is also



darker and the cornicles of the apteræ seem to be more markedly striate.

I append a precis of Blakey's account in the Gardener's Chronicle, 1918. "On May 7th, I found a specimen that had hatched out. On the next day I found another. No. 1 began to produce young on May 17th; No. 2 on the 18th. No. 1 produced one per day, until the 20th, on the 21st, nine, on the 22nd, fifteen and so on until No. 1 had produced sixty by June 31st, and No. 2, sixty by June the 2nd. Sixty young seems to be the number produced by the Mother Queen. When first hatched they are somewhat light olive green with a darker shade down the back. They become lighter in shade, short legged and sluggish and die as soon as the young are produced. After the first moult the young assume the mealy covering and the characteristic markings of the species. The generation produced by the "Mother Queen" are all apterous, these latter produce a mixture of alate and apterous females; the first alate females were found on June 20th and they go on producing both forms until the end of the season. A certain proportion of the third generation lose their mealy coat, no doubt in preparation for migration. Whether they have hosts other than the Plum I do not know, at present, but there is certainly a large proportion that remains on the Plum all the year. They lay their eggs and propagate on the Plum and large numbers, after mid-season, take possession of the long, sappy shoots of the Plum produced in the current years. In August alate females are produced that retain their mealy covering, these seem to be local migrants; they are not nearly so agile as the alatae produced early in the year. They settle down at the end of August and beginning of September on a particular leaf and there produce a brood of 12 to 20 apterous forms; these are much smaller than the apteræ of the early season; dirty sulphur-yellow with a light green band down the back. These are the oviparous females. Egg laying begins in the middle of September. When ovipositing they travel backwards and forwards along the shoots until they find a suitable position at the base of a bud. When that is fixed upon they back themselves into position and there deposit the egg; the operation may take half an hour. They generally select the base of a leaf bud, more particularly right down in the axil and mostly on the outer or upper side of a shoot. In some cases I found as many as six eggs

at the base of a bud, but as a rule one. The ova at the time of deposition are soft and flexible, translucent olive-green, over which is a coat of silvery looking substance, composed of a number of white looking rods. It will be observed that the ova are dormant on the trees for several months."

It thus appears that this Aphid may continue on the Plums all the year, whilst many of the early alatae (those denuded of mealy coating), fly to the reeds, etc., and later a return migrant race fly back to the prunes to form further sexuales.

Takahashi finds it at any season of the year on *Phragmites* in Formosa as viviparae, and that there are two forms of sexuparae *maxima* and *minima*.

Walker's type of *Aphis gracilis* in the British Museum is *arundinis*. It was probably a vagrant on *Salix*.

#### HYALOPTERUS ATRIPLICIS Linnæus.

*Aphis atriplicis* Linnæus.

*Aphis atomaria* Walker.

*Aphis chenopodii* Schrank and Cowen.

*Hayhurstia atriplicis* Del Guercio.

*Brevicoryne chenopodii* Das.

Linnæus, Fn. Suecica, 1000 (1746); Fn. Su. ed. altera, 262 (1761); Schrank, Fn. Boica, II., 109, 1196 (1801); Walker, List. Homop. (B.M.), IV., 982 (1852) (= *chenopodii* and *atriplicis*); Zoologist, VII., App., I., 50 (*atomaria*) (1849); Kaltenbach, Mono. Pflanz., 107 (1843); Die Pflanzenfeinde, 505, 508 (1874); Lichtenstein, La Flore d. Aphid, 88, 85 (1884); Oestlund, Ann. Rept. Geol. and Nat. Hist. Surv. Minnesota, 14, 47 (1896); Passerini, Gli. Afidi, 51 (1860); Buckton, Mono. Brit. Aphides, II., (1879) (= *rumicis* and *atriplicis*) (1879); Bruner, Bull. 23, U.S.A. Dep. Agri. (Div. Ent.), 17 (1891); Williams, Univ. Nebraska Dep. Ent. Spec. Bull. I., 6, 10, 12, 20 (1891); Del Guercio, Nuov. Relaz. R. Staz. Ent. Agri., 1, 2°, 2, 144 (1900); Forbes, Bull., 60, Ill. Agri. Exp. Sta., 430 (1900); Hunter, Bull., 60, Iowa. Agri. Exp. Sta., 63 (1901); Connold, Brit. Veg. Galls, 233, 234, pl. CI. (1902); Bignell, Ann. Rep., 72, Roy. Cornwall Polytech. Soc., 24 (1904); Luff, Guernsey, Soc. Nat. Se. Rep. and Trans., 88 (1905); Schouteden, Mem. Soc. Ent. Belg., II., 216 (1906); Sanborn, Kansas Univ. Sci. Bull., III., 8, 232, 235, 248, 254, 255 (1906);

Hayhurst, Ann. Soc. Ent. Am., II., 11 (1909); Gillette, Journ. Eco. Ent., III., 405 (1910); Cowen, Bull. 31, Colorado Exp. Sta., Theobald, Entomologist, XLIV: (1911); Rep. Eco. Zool. yr. ending Sep. 30, 1911, 75-80 (1912); Ross, Die Pflanzengallen Mittellund Nordeuropas (1911); Grevillius and Niessen, Zoocec. e. Cecd. imprimis provinciæ Rhenanæ Arbeiten des Rheinischen Banern-Vereins, II., 34 (1907); Rostrup, Nat. Hist. Medd., 29, 180 (1896); Martel, Bull. Soc. étud Sci. Nat. Elbeuf., X., 13, No. 10 (1891); Loiselle, Bull. Soc. Hort. Bot. Centre, Normandis, Ext. 2; Kieffer, Ann. Soc. Ent. Fr., I., 70, 266 (1901); Marchal and Chateau, Mém. Soc. Hist. Nat. Autun., XVIII., 242 (1905); Trotter and Cecconi, Cecd. Italica, V., No. 106 (1902); Corti, Bull. Boissier (2), IV., No. 187 (1904); Geisenheyer, Zs. Ent. Neudamm, 34, No. 37 (1902); Stefani-Perez, Miscellanea Cecidologia, 129, Avellano (1906); Mariam, Alt. Soc. Ital. Sci. Nat., 297, 78 (1907); Rübsaamen, Verh. Nahist. Ver., 34, 37 (1890); Schlechtendal, Jahresten ver Nath., 45, 390, 44 (1890); Houard, Sur quelques Zoocécides d l'Asie-Mineuse et du Caucase, Marcellia, I., 50-55 (1902); Les Zoocécides des Plantes d'Europe et d Bassin d. l. Mediteranée (1908-09); Theobald, Board of Agri. Journ., XIX., (1913); Del Guercio, Redia, XII., 208 (1917); Cowen, Hemiptera of Colorado, 119 (1895); Das, Mem. Ind. Mus., VI., 4, 183 (1918); Takahashi, Aphid. Formosa, III., 48, pl. VI., figs. 1-8 (1924).

*Alate viviparous female.* Green, head dusky; antennæ dusky; sensoria on iii. 9 to 13. Eyes red. Rostrum dusky green. Mesothorax greenish-yellow to brown; prescutum, lobes and post scutellum blackish; scutellum brownish with black margin. Base of femora brownish yellow, rest dusky; tibiæ brownish-yellow apices dusky; tarsi dark. Abdomen green to yellowish-green, with irregular dorsal maculations; 4 large dark lateral spots, in front of cornicles. Cornicles dusky, very slightly swollen at and beyond the middle. Cauda pale yellowish, margin anterior to the distinct median constriction black, posterior to which are 3 pairs of long curved hairs, anal plate hairy, 6 to 8 hairs along posterior border.

*Length* 1.49 mm. to 1.5 mm.

*Nymph.* Uniform green in colour, except for irregular darker green areas on thorax, tips of wing-cases dusky.

*Apterous viviparous female.* Greenish ; head dusky yellowish-green, with 2 darker spots. Eyes deep red to almost black. Thorax either uniformly green or with some darker markings. Abdomen same colour as thorax, uniform, except for 4 to 5 dusky lateral spots. Cornicles pale yellowish-green, apices dusky. Thorax and abdomen mealy.

*Length* 1.50 to 1.57 mm.

*Oviparous female.* Green. Eyes red to black. Cornicles dusky. Cauda pale yellow or dusky. Legs dusky, except for paler femoral bases ; hind tibiæ dusky, swollen, with 30 to 40 sensoria.

*Length* 1.45 mm.

*Male.* Apterous. Pronotum dusky ; mesonotum and lobes brownish, the latter darkest. Eyes dark red. Abdomen dusky yellow, dorsum with irregular dusky marks. Lateral tubercles more pronounced than in female. Cornicles dusky. Cauda dusky.

*Length* 1 mm.

FOOD PLANTS. *Chenopodium album* ; *C. murale* ; *C. urbicum* ; *C. quinosa* ; *C. hybridum* ; *C. vulvaria* ; *C. polyspermum* ; *Atriplex patula* ; *A. portulacoides* ; *A. littoralis* ; *A. augustifolia* ; *A. latifolia* ; *A. hortense* ; *A. babingtoni* ; *A. hastatum* (Houard). Cultivated Beet, Sugar Beet and Mangolds.

LOCALITIES. Wye ; Herne Bay ; Seasalter ; Sandwich ; Faversham ; Romney Marsh (F.V.T.) ; Hastings and neighbourhood (Connold) ; Cambridge ; Abingdon ; Corfe Castle (F.V.T.) ; North Wales (Walton) ; Blackford, Edinburgh, 17, vii. 22 (Evans). Common around the London area, and along the sea coast of the N.E. counties of Scotland. It also occurs in Guernsey (Luff) ; Sweden ; Germany ; Hungary ; Italy ; Belgium and many places in North America. Gillette (1910) describes it as a very abundant species generally distributed in Colorado upon both sides of the mountains and up to fully 7,000 feet altitude. Taihoku, Formosa (Takahashi) ; India (Das).

*Observations.* Walker's *Aphis atomaria* (Zool., VII., App. L., (1849) is evidently the oviparous female of this species. His description is as follows :—



Fig. 12.

Boat-like Leaf Galls on *Chenopodium album* caused by *Hyalopterus atriplicis*.

" *The wingless oviparous (?) female*. The body is pale green, oval, convex, of moderate size and thickly covered with white powder ; the antennæ are yellow, black towards their tips and very nearly as long as the body ; the eyes are bright red ; the rostrum is dull yellow, with a black tip ; the tubes at the tip of the abdomen and the other tubes are dull yellow and the latter have black tips and are about one-sixth of the length of the body ; the legs are yellow ; the hind tibiæ from the base to the middle,

the tarsi and the tips of the other tibiæ are black. Found in the beginning of October on *Atriplex angustifolia*."

The boat-shaped leaf-galls are very marked (vide figure 12), but on some *Chenopodiums* they do not seem to curl the foliage so much. Takahashi describes Schrank's *Aphis chenopodii* on *C. album* in Formosa, and Das from India. Schrank's *chenopodii* is clearly *atriplicis*. Takahashi describes an alate male. His insect may not be the same but from the description his identification seems to be all right.

#### HYALOPTERUS MELANOCEPHALUS Buckton.

Mono. Brit. Aphid., II., 116, pl. LXXVII., figs. 5-7 (1877).

*Apterous viviparous female.* Pale green to yellowish-white, covered with white mealy powder; oval to elongate oval. Head dusky grey to brown, broad and convex, with scattered hairs. Abdomen showing scarcely any segmentation. Antennæ variable in length, from not quite half to half length of body; brownish, some paler than others; segment i. larger than ii.; iii. longest; iv. and v. equal; vi. with basal area nearly as long as v.; flagellum about twice as long as base. Eyes black. Rostrum pale green, dusky at base and apex, just reaching second coxæ. Cornicles very short, black, showing some transverse lines and imbrications. Cauda black, more than twice the length of the cornicles, 3 hairs each side and 1 dorso-apical. Anal plate dusky. Legs brown, covered with white meal.

*Length* 1.5 to 1.8 mm.

*Alate viviparous female.* Head, pronotum and mesonotum black. Abdomen pale greyish-green. The whole insect, but especially the abdomen, covered with meal, which very quickly disappears when the insect leaves the plant. Antennæ dark, shorter than body; segment i. wider than ii. and about the same length; iii. about same length as flagellum of vi., with 7 to 9 sensoria; iv. and v. about equal; iv. in some specimens with a single sub-apical sensorium; v. with usual large primary sensorium and often another small one by its side; vi. with flagellum more than twice as long as basal area. Cornicles very small, black, a little longer than wide, with a few transverse striæ and some rough imbrications. Cauda black, more than 3 times



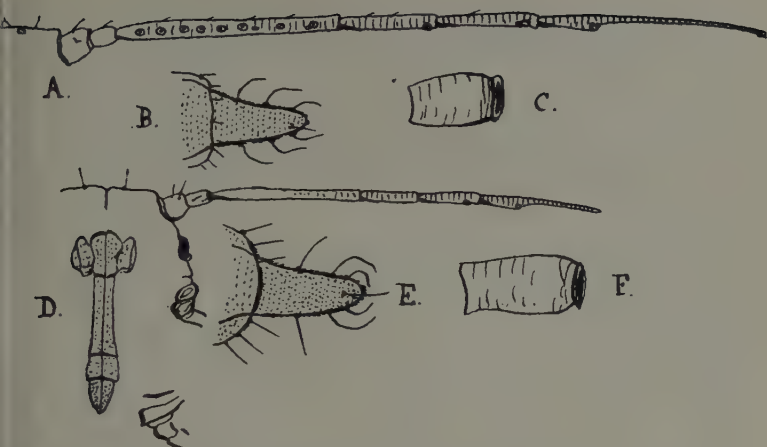


Fig. 13.—*Hyalopterus melanocephalus* Buckton.

A. Antenna ; B. Cauda ; C. Cornicle of alate ♀ ; D.E. and F. of apterous ♀.

length of cornicles, bluntly acuminate ; 2 pairs of lateral hairs and 2 dorso-apical median ones. Anal plate dark. Legs pale greenish, in some the tarsi and apices of tibiae dusky. Stigma greyish brown ; cubitus brown ; veins rather thick.

*Length* 1.2 to 1.8 mm.

*FOOD PLANTS.* *Silene inflata* ; *Silene* sp. (?)

*LOCALITIES.* Haslemere ; Brandon (Buckton) ; Purley ; Fowey (F.V.T.).

*Observations.* This very marked species lives in the flower capsules and around the flowers and top leaves of *Silene* and forms contorted bunches of them on the tops of the plants ; the leaves become curled and twisted into a mass and under and around them and the flowers the aphides swarm. They produce much loose woolly matter and numerous woolly globules of an oily nature. The attacked heads later die off and turn brown. I found them in May at Fowey in small numbers and at Purley in July in vast swarms. Buckton records it in July and August. There is much variation in the relative lengths of the antennæ and to some extent the rostrum ; antennal segment iv. also varies in that it may or may not have a sub-apical sensorium. Buckton describes the legs

of the apteræ as "white, with sooty knees and tarsi"; all I have found have had brown legs, but covered with white meal. The nymphæ resemble the larvæ, but the thorax is much paler; the tips or half the wing-pads are dusky. The colonies taken at Purley all became alatae by July 30th. It comes near *H. atriplicis*, the cauda being much narrower than in typical *Hyalopterus* and may with *atriplicis* possibly have to be referred to the genus *Hayhurstia*.

### Genus PERGANDEIDA Schouteden.

Schouteden, Zool. Anz., XXVI., 685 (1903); Baker, Bull. 826, U.S. Dep. Agri., 49 (1920).

Head without prominent frontal tubercles; antennæ of 6 segments. Cornicles short, almost as wide as long. Cauda long and broad, with few lateral hairs. Flagellum of antennal segment vi. longer than base. Fore wings with media twice branched; hind wings with media and cubitus present.

Baker spells this *Pergandeidia*. The type fixed by Schouteden is *ononidis*, which I have not seen. Baker sinks *Longicaudus* under this genus.; it seems to me to be quite distinct. *Pergandeida* is close to *Hyalopterus* and only differs in the form of the cornicles. *Longicaudus* has the flagellum about as long as the base of vi. and the large cauda with many lateral hairs.

### PERGANDEIDA GALII Kaltenbach.

*Aphis galii* Kaltenbach.

Kaltenbach, Mono. Pflanz., 87 (1843).

*Apterous viviparous female*. Black, with grey or greyish-blue mealy coating in most specimens, some shiny. Legs black, except base of femora and basal portion of tibiæ, which are pale greenish-white to pale dull yellow. Cauda and cornicles black. Antennæ very much shorter than body, of 6 segments; i. larger than ii.; iii. much longer than iv.; iv. nearly equal to v.; vi. longer than iii., flagellum about equal to it; basal area nearly half flagellum. Rostrum reaches to or nearly to second coxæ, seldom beyond. Cornicles short and thick, expanding basally, about as long as antennal segments i. and ii.; very much shorter than cauda; almost spiral imbrication. Cauda about as long as antennal segment iii., much wider and narrowing apically, constricted

near middle; 2 hairs each side and 1 dorso-apical. Anal plate wider than cauda, with a few hairs. Cauda projecting well beyond cornicles. Legs rather short and thick; femora and tibiæ with numerous hairs. Head flat in front, with 2 short hairs.

*Length* 1 to 1.6 mm.

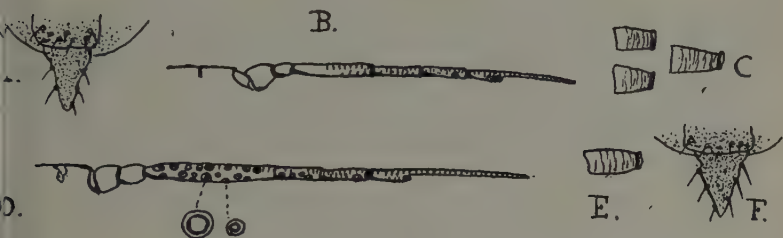


Fig. 14.—*Pergandeida galii* Kaltenbach.

A.B.C. Apterous ♀; Cauda, antenna and cornicles; D.E.F. of alate ♀.

*Alate viviparous female.* Black; abdomen deep blackish-brown to black, somewhat shiny, but often with a bluish dull meal. Cornicles and cauda black; antennæ black, but basal area of segment iii. pallid and in some the base of iv. may be pale. Legs black, except base of femora and base of tibiæ, which are pallid. Antennæ shorter than body, of 6 segments; segment i. wider but no longer than ii.; iii. more than 3 times length of iv., not quite so long as vi., with 17 to 20 rather large sensoria over whole length; iv. slightly longer than v., with 4 to 6 sensoria; v. about as long as base of vi., flagellum not quite so long as iii. Cornicles short and thick, not quite so long as two basal antennal segments; slightly constricted apically. Cauda nearly twice as long as cornicles; acutely triangulate; 3 hairs each side; projecting well beyond cornicles. Rostrum green, reaching to or nearly to second coxæ.

*Length* 1.3 to 1.8 mm.

FOOD PLANTS. *Galium* spp.

LOCALITIES. Sandwich, 19 viii. 23; Hastings; Stowting, near Hythe, Kent.

*Observations.* A fairly common species where found on *Galium mollugo* and several other Bedstraws, clustering in the flower heads

in July and August. Its dark colour with other species like *Myzus cerasi* shows up against the yellow and white flowers of the Bedstraws.

PERGANDEIDA STANILANDI Laing.

Ent. Mo. Mag., LIX., 3 Se., ix. 240 (fig. 2, A-D) (1923).

*Apterous viviparous female.* "Small, bright yellowish-green, cauda usually slightly darker. Antennæ apparently composed of 5 segments; proportions of segments 10, 10, 35, 18 (16 + 20); total length 0.5 mm. Papillæ on lateral margins of prothorax, first to seventh abdominal segments. Hind tibiæ about four-fifths the length of the antennæ. Cornicles from 2 to  $2\frac{1}{2}$  times longer than broad and about the same length as the cauda. Total length approximately 1 mm.

*Apterous oviparous female.* Differing from the apterous viviparous female in the slightly larger size. Head in cleared specimens distinctly darker than the remainder of the body. The proportions of the antennal segments are as 30, 25, 100, 50 (35 + 75), the third segment showing signs of being composed of two fused together in one of the specimens available for study. Cornicles three times longer than the width at base and twice the length of antennal segment ii. Cauda rather shorter and more obtuse than in the apterous viviparous female. Hind tibia with rather large circular sensoria.

*Length* 1.5 mm.

Described from two specimens.

*Male.* Apterous. Head much darker than remainder of body. Antennæ 5 segmented, the third sub-equal to the terminal and with an indication of being composed of two fused together; iii. with nine small secondary sensoria on the apical two-thirds, iv. with two to three in addition to the primary subterminal sensorium; proportions of segments 25, 25, 115, 60 (35 + 70). Rostrum reaching to between hind pair of coxæ. Cornicles cylindrical, two-thirds length of antennal segment iv. and sub-equal to cauda.

*Length* 1 mm.

Described from one specimen (F. Laing).

Middlesex, Muswell Hill on *Urtica dioca*, 1920 and 1921 (L. N. Staniland). This species has been found in abundance on the

host plant by the collector, but he has not yet been successful in obtaining any alate form. Ribchester, 20 x. 25 (Britten) sexuales.

Genus LONGICAUDUS Van der Goot.

Tijds., V., Ent., 56, 146 (1913).

Very similar to *Hyalopterus* and *Pergandeida*, but the cauda is longer and larger, and has more lateral hairs; the flagellum of the vi. segment of the antennæ is also different being about the same length on the basal area. Head and cornicles much as in *Pergandeida*.

Type of the genus *Aphis trirhodus* Walker.

Two species occur in Great Britain:—

1. *Longicaudus trirhodus* Walker.
2. *Longicaudus dilineatus* Buckton.

LONGICAUDUS TRIRHODUS Walker.

*Aphis trirhodus* Walker.

*Aphis aquilegiæ-flavus* Kittel.

*Hyalopterus aquilegiæ* Koch.

*Hyalopterus trirhodus* Buckton.

*Hyalopterus flavus* Schouteden.

*Pergandeida flavus* Theobald.

Walker, Ann. Nat. Hist., Se. 2, IV., 45, 69 (1849); List. Homop. (B.M.), IV., 979, 77 (1852); Kittel, Mém. Soc. Linn., Paris, V., 48 (1827); Koch, Die Pflanz., 3, 19, figs. 25, 26 (1857); Passerini, Aphid. Ital., 149, 150 (1863); Bull. Ent. Soc. Ital., III., 150, 336 (1871); Buckton, Mono. Brit. Aph., II., 114, pl. LXXVII., figs. 1, 4 (1877); Del Guercio, Nuov. Relaz., R. Staz. Ent. Agri., I., 202, 146 (1909); Schouteden, Mém. Soc. Ent. Belg., XII., 230 (1906); Mordwilko, Beitrage, 3, Biol. d. Pflanz. Bio. Centralbd. Bd., 27, 815 (1907); Hayhurst, Journ. New York Ent. Soc., XVII., 107-109 (1909); V. d. Goot, Overg., n.t., Tijdsch, v. Ent., 105 (1913).

*Apterous viviparous female.* Yellowish-green to pale apple green, some almost yellow; oval, smooth, slightly pulverulent. Antennæ shorter than body, green; segment i. a little broader than ii.; iii. longest; iv. and v. about equal; vi. short; flagellum about same length as base. Eyes red-brown.

Rostrum green, apex dusky, reaching past second coxæ. Cornicles very small, green, with some faint irregular transverse lines at apices. Cauda yellow to green, long, quite four times length of cornicles, with 7 to 8 pairs of lateral hairs. Legs green to yellow-green; tarsi dusky; in some apices of tibiæ dusky.

Length 1.5 to 1.8 mm.

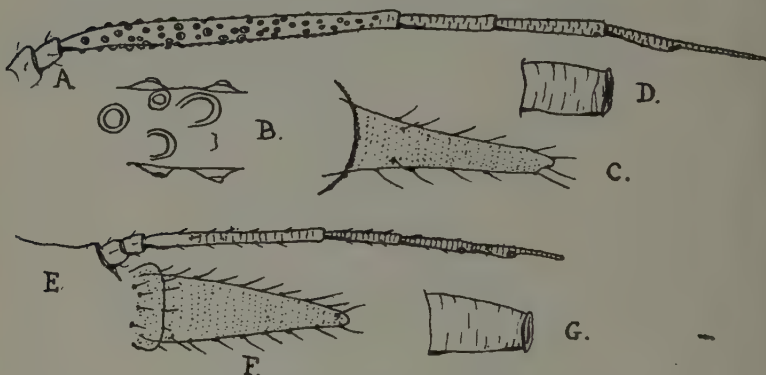


Fig. 15.—*Longicaudus trirhodus* Walker.

Alate ♀; A. and B. antenna, D. cornicle, and C. cauda; E. antenna, F. cauda, G. cornicle of apterous ♀.

*Alate viviparous female.* Head black; pronotum, thoracic lobes, scutellum and a semicircular patch on basal abdominal segment and a broad irregular patch on dorsum of abdomen black, rest of body green. Antennæ not quite so long as body; segment i. wider than ii.; iii. very long, as long as iv. + v. + vi., with many prominent sensoria, giving a tuberculate appearance; vi. longer than v., its two parts nearly equal. Eyes large, black. Rostrum green, apex dark, not quite reaching second coxæ. Cornicles very short, green, variable in form, some uniformly cylindrical, others broadened at base, with a few irregular indistinct striæ. Cauda green, at least twice as long as cornicles, 6 pairs of lateral hairs, two often being dorso-apical. Legs yellowish-green; tarsi, apices of tibiæ and femora brown. Wings with yellowish insertions. Veins brownish; stigma and cubitus yellowish-grey.

Length 1.7 to 1.8 mm.



FOOD PLANTS. *Aquilegia vulgaris* and varieties ; *Rosa* spp. ; *Thalictrum minus*, etc.

LOCALITIES. Dover ; Wye ; Faversham ; Tonbridge ; Maidstone ; Purley ; Woking ; Kingston-on-Thames ; Guildford ; Hastings ; Little Hadham ; New Forest ; Ventnor (F.V.T.) ; Castleton, Derbyshire, vii. 25 on *Thalictrum minus* (Dallman) ; Doncaster, viii. 25, Dingwall, N. B., 6 iv. 17 (D. Jackson) ; Tooting, Fulham, Hendon, Birmingham, Blackpool (Laing) ; France ; Germany ; Belgium ; Italy ; Russia ; North America.

*Observations.* This species occurs on the leaves and blossom buds of roses in small colonies but do not seem to do much harm to them in Great Britain. On Columbines in gardens it may, however, be very harmful. It winters on Roses and may be found in small colonies on the leaves up to the end of May or early June when alatae appear and migrate to Columbines. On the latter they breed rapidly and remain until late August and some even into October. It then flies back to the roses; sexual broods appear and eggs are laid. On the Aquilegias it lives in colonies of ten up to sixty, both on and under the leaves, which become pale, red or purple in colour. Alate broods are produced and these fly off to other Columbines. The apteræ are very sluggish in habits, frequently remaining for hours without any apparent movement. It is subject to much variation in colour in all stages, but especially in the alate female. Walker describes no less than nine varieties ; one which has a dark green abdomen ; another in which the abdominal markings are absent. Now and then I have found the apteræ very deep green ; others with almost white legs, others with brown and deep green legs. One of the commonest forms on the Rose has the body with 7 to 9 transverse dark bars, in some appearing as paired elongate spots. The pulverulence is also much more marked in some than others. It may possibly oviposit on *Aquilegias*, for Koch observed isolated Stem Mothers depositing larvæ on Columbines towards the end of May and he noticed winged viviparæ early in June. I have found alatae on Roses early in June and some as early as May 3rd, and it is quite likely that these fly at once to *Aquilegias* and produce larvæ that become mature apteræ in that month. Mordwilko (1907) has shown that individuals from Columbines

could be induced to live on the Rose nine days in September, but he does not state that sexual forms were produced. I have frequently transferred alatae from Roses to Columbines and they soon produced colonies of young.

Walker describes the male as follows:—"Male. The third joint of the antennæ is rather stout; the fourth is slender and less than half the length of the third; fifth a little shorter than fourth and the sixth than the fifth; seventh is much shorter than the sixth. Length of body  $\frac{3}{4}$  to 1 line; of the wings  $2\frac{1}{2}$  to 3 lines."

The form on the *Thalictrium* is pale yellow and very delicate, but I am sure is the same species.

#### LONGICAUDUS DILINEATUS Buckton.

##### *Hyalopterus dilineatus* Buckton.

Buckton, Mono. Brit. Aphid., II., 113, pl. LXXVI. (1877).

*Alate viviparous female*. Pale green to yellowish-green. Head, thoracic lobes and scutellum black and shiny. Abdomen shiny and in some there are darker green transverse bars. Cauda green, long, acuminate. Cornicles small, somewhat thickened at their bases, about half of cauda, green to pale green. Antennæ green, shorter than body to nearly as long; segment iii. with many sensoria; in some apices of antennæ are darkened. Legs green; tarsi dusky. Wings with yellowish insertions; veins brown; stigma greyish-brown.

Length 1.6 to 1.8 mm.

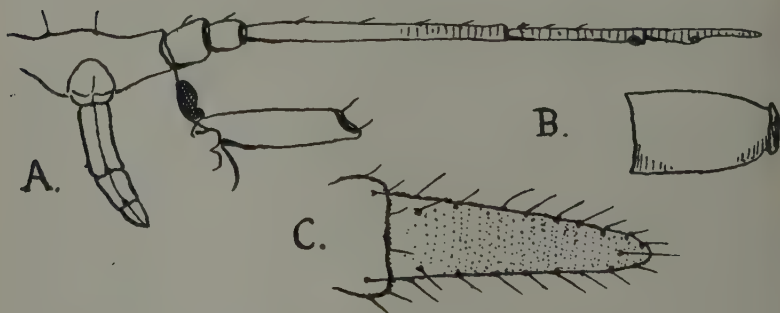


Fig. 16.—*Longicaudus dilineatus* Walker.  
A. Head, antenna and rostrum of apterous ♀; B. Cornicle; C. Cauda.

*Apterous viviparous female.* Pale yellow-green to bright grass-green; two prominent dark-green lines down the dorsum. Antennæ much shorter than body; pale green, becoming dusky at apices; segment i. wider than ii.; iii. longest; iv. and v. short, of equal length; vi. short, about as long as iv. + v., basal area as long as flagellum. Rostrum green, very short, rather broad, only just passing second coxæ. Cauda long, bluntly acuminate; pale green, 9 to 10 pairs of lateral hairs and 2 basal sub-median ones and 1 dorso-apical. Cornicles about half length of cauda; pale green; somewhat contracted at apices. Legs green to pale green; tarsi slightly dusky. Eyes black.

*Length* 1.5 to 1.8 mm.

*Oviparous female.* "Small, broad, oval, colour ochreous-brown, carina paler. Vertex very prominent. Head brown. Eyes red. Cornicles and legs darker brown." Notice that Buckton heads this description as apterous viviparous female, though he means *oviparous* (F. Laing).

*Length* 1.13 mm. (Buckton).

FOOD PLANTS. *Rosa spp.* both wild and cultivated.

LOCALITIES. Haslemere and Wanstead (Buckton); Alnwick (Hardy); Wye; Tonbridge; Little Hadham; Widdington; Esher; Kingston-on-Thames; Brondesbury, London, N.W.; Fowey (F.V.T.); Great Salkeld (Britten).

*Observations.* Apparently uncommon. I have only found it in small colonies on roses, consisting of apteræ and larvæ. I have never been able to obtain alate females. It seems to occur first in April and goes on until the autumn and winter, when sexuales are produced. Buckton describes the oviparous female taken on a dry rose leaf on December 8th, on the previous night the thermometer had registered 23°F. He watched the female lay two yellow eggs, which later became shiny black. They measured 0.02 inch in long diameter, that is nearly half the length of the female. Buckton bred the alate viviparous female in May from specimens sent him as nymphæ. The nymphæ are bright green, slightly mealy and were found by Hardy on the Moss Rose in May. This Aphid lives chiefly on the leaves, but may occur on the stem and shoots and mixed up with *Macrosiphum rosæ* I have also noticed a faint mealy coating in the apteræ. Buckton

describes a variety as follows :—" More linear. Nectaries long. Head, 2 thoracic spots and 2 broad converging lines down dorsum dark brown. Cauda dark and hirsute."

Buckton has three slides marked *dilineatus*. (1) *Capitophorus rosarum*; (2) *Macrosiphum rosæ* and nymphs of a *Longicaudus*; (3) one alate female, *Longicaudus*. I am doubtful of this being distinct from *trirhodus*. I have never found anything purporting to be this species (F. Laing).

### Genus LIOSOMAPHIS Walker.

Walker, Zoologist, 1119 (1868); Baker, Bull. 826, U.S. Dep. Agri., 48 (1920).

Head without any frontal tubercles. Antennæ of 6 segments, sensoria circular in alatæ; rather short, base of vi. nearly as long as the flagellum. Cornicles elongate, much swollen in middle, constricted near base, in both alatæ and apteræ. Cauda not so long as cornicles, narrowly conical. Oviparous females apterous. *Type Aphis berberidis* Kaltenbach.

This genus is allied to *Rhopalosiphum* but can be demarked by the abruptly swollen cornicles, which are much more inflated and by the nearly equal size of base and flagellum of vi. One species only occurs in this genus in Great Britain, *Liosomaphis berberides* Kalt.

### LIOSOMAPHIS BERBERIDIS Kaltenbach.

*Aphis berberidis* Kaltenbach.

*Liosomaphis berberidis* Walker.

*Rhopalosiphum berberidis* Koch.

Kaltenbach, Mono. Pflanz., 95 (1843); Walker, Ann. Nat. Hist., Se. 2, VI., 118, 96 (1850); Walker, List. Homop. (B.M.), IV., 996 (1852); Koch, Die Pflanz., 30, figs. 38, 39 (1857); Buckton, Mono. Brit. Aphid, II., 14, pl. XLII. (1877); Schouteden, Cat. Aphid. Belg., 234 (1906); Davis, Ann. Soc. Ent. Amer., I., 254 (1908); Theobald, Entomologist, XLIV. (1911); Theobald, Hastings and E. Sussex Nat., II., 1, 16 (1912); Glendenning, Proc. Ent. Soc. Brit. Columbia, No. 22, 37 (1925).

*Alate viviparous female.* Pale green or yellow to yellowish-green; in some head and thorax brownish to brownish-green;

pronotal band and thoracic lobes darker brown. Antennæ about as long as body; segments i. and ii. green, the others olive-green to green; in some with apices of segments dusky; iii. longest, slightly longer than vi., with 23 to 26 sensoria over whole length; iv. nearly two-thirds length of iii., with 8 to 9 sensoria; v. a little shorter than iv., with 3 sensoria; base of vi. about as long as flagellum and not quite so long as v. Cornicles yellow to green, now and then dusky apices; much swollen on apical two-thirds; more than twice as long as the green cauda, now and then three times as long; a few apical striæ, rest imbricate. Cauda with 12 hairs each side and 1 dorso-apical. Rostrum reaches second coxæ (Buckton says third); green. Legs yellow to pale green; tarsi dusky, rarely apices of tibiæ. Eyes deep red to reddish-brown. Stigma green; veins pale brownish.

Length 2 to 2.5 mm.

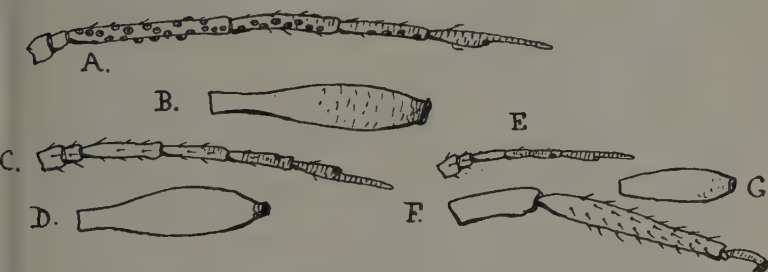


Fig. 16.—*Liosomaphis berberidis* Kaltenbach.

A. Alate viviparous ♀ antenna; B. Cornicle; C. antenna, D. cornicle apterous viviparous ♀; E. antenna, F. hind leg, G. cornicle of apterous oviparous ♀ (immature).

*Apterous viviparous female.* Green or yellow of various shades; sometimes with green spots of deeper shades and which may be confluent and form a line each side, when mature; when young and actually when reproducing it is more uniform in colour and shiny. Antennæ not half length of body, pale yellowish-brown at apices, green at base or whitish yellow with brown apices; segment iii. a little longer than iv.; iv. and v. about equal; vi. slightly shorter than iv. + v.; basal area and flagellum about

equal in length. Eyes reddish black. Rostrum green, apex black, reaching to second coxæ. Cornicles yellow to yellow-green, much longer than cauda, narrower basally, the distal half to one-third often much inflated; a few small transverse striæ at apices. Legs pale yellow to pale yellowish-green; tarsi dusky. Cauda yellow, about half length of cornicles; hairs very pallid.

*Length* 1.8 to 2 mm.

*Oviparous female.* Apterous. Green to yellow, with green spots on the dorsum and in balsam preparations some black spots show up. Antennæ brown basally, yellow or green, or pale yellow to white with dusky tips: about half length of body; segment i. wider but no longer than ii.; iii. a little longer than iv. and about as long as v.; vi. longest, the flagellum a little longer than basal area. Legs yellow; apices dusky on tibiæ; tarsi dusky; hind tibiæ swollen with some short hairs and many circular sensoria. Cornicles yellow to green, apices dusky. Eyes and apex of rostrum dark.

*Length* 1.2 to 1.5 mm.

*Male.* I have not seen this. Walker describes it as follows: "Winged male. Appears in October and then pairs with the oviparous female. It is yellow; the fore chest except the border is grey; the middle chest and breast, a row of short bands along the back of the abdomen, the tips of the nectaries, the knees, the feet and tips of the shanks are black; the eyes are dark red."

Davis describes the male as follows:—"Head black with gibbous frontal lobes. Antennæ black, except the two basal segments, reaching beyond the tip of the abdomen; segment i. gibbous; iii. the largest and the last three more or less imbricated; irregularly placed sensoria as follows:—19-29 on iii.; 5 to 10 on iv.; 5 to 7 on v. and several at the distal end of the basal portion of vi. Eyes black. Thoracic plates black. Legs dirty yellow, except the articulations, which are dark and the tarsi which are black. Abdomen yellow, with black transverse bars, the anterior ones being broken along the median line. Cornicles concolorous with the abdomen and darkening towards the apex, extending beyond the tip of the abdomen; distal two-thirds strongly



incrassate, tip more or less flaring. Style dusky to black, conical or slightly longer than hind tarsus. Length of body, 1.2784 mm."

The male pupa is greenish-yellow. Eyes dark red-brown.

FOOD PLANTS. *Berberis vulgaris*; *Makonia* sp. (C. L. Walton).

LOCALITIES. Kingston-on-Thames, 27, viii. 96; Hastings, vii. 11; Wye, vi.-viii. and ix.; Fallapit, South Devon, viii., 12 (F.V.T.); Chandlers Ford, New Forest, 24, iv. 12 (Duffield); Tregarth, Bethesda, North Wales, 20, vi. 23 (Walton); Wanstead, vi. and Albery, Herts., vii. (Buckton); Kew Gardens, Hampton Court, Lynton, N. Devon (F. Laing).

America (Asa Fitch, Davis, etc.); British Columbia (Glen-denning); Germany.

*Observations.* I have found this insect on the Barberry at Wye right through the year. It occurs in greater numbers in June and July, when alatae appear. I have only once seen them make use of their wings and believe that their flight must be very early in the morning, for one tree crowded with alatae on July 4th at 8 o'clock at night showed no trace of alatae next morning at seven. Alatae appear again in August, but apterae could always be found in small numbers. In 1911 all the alatae had gone by August 20th. There is, however, undoubtedly a migration to some other plant or to other species of Barberry. The sexuales appear in October and November, but I have never been able to find males, although females occur in numbers. The ova are laid in very small numbers near a bud and hatch in April. They are at first orange and then become black, in some cases they are laid in crevices of the bark. These insects feed under the leaves and seem to produce little or no effect upon them. I have never noticed any honeydew with this Aphid. Walker says sixty or more dwell under one leaf. I have never seen as many as this, but forty is no unusual number. It is subject to much variation in colour, some are greenish-yellow, others clear yellow or even orange, some are bright and shiny, others are dull. The apterae usually show, when yellow, a green spot on each side at first and later a number of spots. I once found this insect attacked by a Chalcid parasite, but it did not appear to have any material effect on checking it, for in the next year the bushes were attacked as

usual. Walker says, " In the summer it is sometimes the prey of an *Aphidius* and then becomes very white and globular."

Davis describes the " Stem-Mother " as follows :—" General appearance to the naked eye orange. Head and thorax almost entirely bright orange. Antennæ white or nearly so, excepting the tips, which are dusky. Legs concolourous with antennæ, excepting the tarsi, which are dark. Abdomen with two lateral abdominal stripes of orange, the central dorsum pale greenish or yellowish, with longitudinal stripes of orange, the last three abdominal segments entirely orange. Cornicles pale whitish, except extreme tips. Style orange yellow. Otherwise as the wingless female of the succeeding generations, excepting the measurements of the total length and width, the Stem-Mother usually being the greater. The immature Stem-Mother (first and second instars) is reddish brown with dark (almost black) markings as follows :—two longitudinal rows of bars along the median dorsum and only separated by a fine line of the body colour and two longitudinal rows of spots, one on each of the lateral margins. Head very dark, with a median line dividing the dark area into two patches. Antennæ dusky."

The " Stem-Mothers " I have found in my garden at Wye do not present quite the same appearance and I notice very little difference in colour to the ordinary apterous females, except that they are more swollen and in some years they are more orange in colour.

Genus BREVICORYNE Van der Goot.

*Ædisiphum* Van der Goot.

*Brevicoryne* Das.\*

Van der Goot, Beiträge Kennt. d. Holl. Blattläuse, 245 (1915) ; V. d. Goot, Zur. Kennt. d. Blattläuse Javàs, 122 (1916) ; Das, Mem. Ind. Mus., VI., 179 (1918) ; Baker, Bull. 826, U.S.A. Dep. Agri., 45 (1920).

Head without any prominent frontal tubercles. Antennæ of 6 segments and in alatae with distinct round sensoria. Cornicles

\* *Brevicoryne* Das. The name was coined by Das and is credited to him by Van der Goot in *Beit. Kenn. Holl. Blättl.* Das treats it as a new genus in Mem. Ind. Mus., VI., 179, and includes three species. As Van der Goot was the first to define the genus and included but one species (*brassicæ*) he must be regarded as having priority.

short, swollen in middle and not much longer than cauda. Cauda short and broadly conical. Venation normal. Males alate. Oviparous females apterous.

Type set by Van der Goot *Aphis brassicæ* Linnæus.

A single species only occurs in Great Britain.

# BREVICORYNE BRASSICÆ Linnæus.

*Aphis brassicæ* Linnæus.

*Aphis floris-rapæ* Curtis.

*Aphis isatidis* Boyer.

*Aphis raphani* Schrank.

*Siphocoryne brassicæ* Schouteden, etc.

Linnæus, Syst. Nat., II., 734, 12 (1758) ; Fn. Suec. 985 (1789) ; Schrank, Fn. Boic., II., 119, 1228 (1801) ; Fabricius, Ent. Syst., IV., 218, 41 (1794) ; Syst. Rhyng., 300, 41 (1803) ; Kaltenbach, Mono. Pflanz., 106 (1843) ; Koch, Die Pflanz., 149, 72, figs. 203-204 (1854) ; Passerini, Aphid. Ital., 25, 3 (1863) ; Ferrari, Ann. d. Mus. Civ. Stor. Nat. d. Genova, II., 63, 38 (1872) ; Walker, Ann. Nat. Hist., Se. 2, IV., 46, 47 (1849) ; Cat. List. Homop. (B.M.), 979-80 (1852) ; Harris, Ins. Inj. Veg., 238 (1863) ; Walsh, Proc. Ent. Soc. Phil., I., 298 (1862) ; Curtis, Farm Insects, 69 (1860) ; Journ. Agri. Soc., III., 55, pl. C., figs. 7 and 8 ; Boyer, Ann. Soc. Ent. Fr., X., 165, 4 (1841) ; Mosley, Gard. Chron., I., 827 (1860) ; Figari, Studii. Scient. S. Egitto, 1, 289 (1864) ; Amyot, Ann. Soc. Ent. Fr., Se. 2, V., 478 (1872) ; Fitch, 11th Rept. N.Y., 55 (1867) ; Le Baron, Prairie Farmer, 41, 282 (1870) ; Thomas, 8th Ann. Rept. Ill., 91 (1879) ; Buckton, Mono. Brit. Aph., II., 33, pl. XLVI., figs. 1 to 6 (1877) ; Ormerod, Inj. Ins., 1881, 4 (1882) ; Macchiati, Bull. d. Soc. Ent. Ital., 238 (1883) ; Riley, Rept. U.S. Ent. for 1884, 317 (1884) ; Ormerod, Inj. Ins., 1883, 9 (1884) ; Fletcher, Rept. Entomo. Canada, Dep. Agri., 74 (1885) ; Lintner, Sec. Rept. N.Y., 32 (1885) ; Ormerod, Inj. Ins., 1885, 39 (1886) ; Oestlund, Aphid. Minn. Bull. 4, Geol. and Nat. Hist. Surv. Minn., 57 (1887) ; Fletcher, Ann. Rep. Ent. Cent. Exp. Farm, Canada (Dep. Agri.), 1887, 19 (1888) ; Weed, Insect Life, III., 299 (1890) ; Smith, N. Jersey Bull., 72, 6 (1890) ; and 11th Rept., 507 (1890) ; Lintner, 7th Rept. N.Y., 317 (1890) ; Bos, Tierrische, Schad. n. Nutzl., 567 (1891) ; Lintner, 8th Rept. N.Y., 405, 214, 440 (1891) ; Williams, Nebraska Spec. Bull., 1 (1891) ; Lintner, 9th Rept. N.Y., 495 (1892) ; Weed, Mus. Bull., 21, 10 (1892) ; Webster,

Ohio, Bull., 51, 109 (1893); Ormerod, Inj. Ins., 1892, 20-23 (1893); Sirrine, Bull. 83, N.Y. Geneva Sta., 673 (1894); Taft and Davis, Mich. Bull., 121, 62 (1895); Cowen, Hemip. of Colorado, 118 (1895); Quaintance, Fla. Bull., 34, 270 (1896); Smith, Maryland, Bull. 48, 97 (1897); Gillette, Col. Bull., 47, 44 (1898); Ormerod, Inj. Ins., 1897, 10 to 13 (1898); Fletcher, 29th Ann. Rept. Ent. Soc., Ontario, 80 (1899); Lounsbury, Cape Agri. Journ., 14 Sept. (1899); Lugg, Minn. Bull., 60, 185 (1900); Close, Utah. Bull., 65, 77 (1900); Hunter, Iowa Bull., 60, 93 (1901); Leonardi, Gli. Insetti Nocivi, IV., 217 (1901); Fuller, 1st Rept. Entomo. Natal, 95 (1901); Fletcher, 31st Rept. Ent. Soc. Ont., 70 (1901); Dewar, Rept. Gov. Ent. Orange River Colony, 24 (1902); Gillette, U.S. Bur. Ent. n.s. Bull., 31, 54 (1902); Chittenden, U.S. Bur. Ent. Bull., 33, n.s., 83 (1902); Cooley, Montana, 10th Rept., 48 (1903); Ehrhorn Cal., 1st Bien. Rept. Comm. Hort., 110 (1904); Fletcher, 34th Ann. Rept. Ent. Soc., Ont., 67 (1904); Felt, 19th Rept. N.Y. Ent. Bull., 76, Stat. Mus., 133-176, 180-182 (1904); Fletcher, U.S. Bur. Ent. Bull., 46, 83 (1904); Sanborn, Kansas Aphididæ, Kans. Univ. Bull., III., 1, 54 (1904); Froggatt, Agri. Gaz. N.S. Wales, Oct. 6 (1905); Schouteden, Mem. Soc. Ent. Belg., XII., 217, 4 (1906); Chittenden, Inj. Ins. to Vegetables, 151 (1907); Smith, N.C. Bull., 197, 17 (1908); Bethune, 38th Ann. Rept. Ent. Soc., Ont., 98 (1908); Theobald, Rept. Eco. Zool. for 1905, 55-59 (1906); 1st Rept. Eco. Zool. (B.M.), 93 (1903); Rept. Eco. Zool. for 1911, 92 (1912); Martelli, Boll. Lab. Zool. Portici V., 40-54 (1911); Carpenter, Inj. Ins., Ireland, 1905, 321, 326 (1906); and 502 (1909); Lefroy, Ind. Insect Life, 747 (1909); Theobald, Rept. Eco. Zool. for 1911, 92 (1912); Herrick and Hungate, Agri. Exp. Sta., Cornell. Bull., 300, 717-746 (1911); Essig, Pomona Journ. Ent., III., 3, 523 (1911); Herrick, Journ. Eco. Ent., IV., 219-224 (1912); V. d. Goot, Overg. n.h. Tijds. v. Ent., LVI., 93, fig. 7 (1913); Theobald, Bull. Ent. Res., IV., 320 (1914); and VIII., 293 (1918); Essig and Kuwana, Proc. Calif. Acad. Sci., VIII., 3, 68 (1918); Matsumura, Journ. Coll. Agri., Tohoku. Imp. Univ., VII., 356 (1917); Das, Aphid. Lahore, Mem. Ind. Mus., VI., 187 (1918); Takahashi, Aphid. Formosa; Dept. Agri. Gov. Res. Inst., Formosa, Pt. I., 68 (1921), Pt. IV., Rept. 16, 27 (1925); Moreira, Pulgões de Brasil, Bol. 2, Inst. Biol., e.d. Agri., 19 (1925); Hall, Aphid. Egypt, 27 (1926); Willcocks,

Sult. Agri. Soc., Bull., I. (1922); Glendenning, Proc. Ent. Soc. Brit. Columbia, No. 21, 41 (1924).

*Alate viviparous female.* Head black; pronotum deep brown, rest of thorax black. Abdomen yellowish-green to dull green, a row of 4 black spots on each side and dark transverse bars in centre, more or less broken. Cornicles dark, short. Antennæ about as long as body, dark brown. Cauda dark. Legs brown to almost black. Antennæ with segment i. larger than ii.; iii. two and a half to three times length of iv.; with 50 to 60 sensoria



Fig. 18.—*Brevicoryne brassicæ* Linnaeus.  
Alate females (Blakey). Much enlarged.

over whole length, not so long as vi.; iv. about as long or a little longer than v.; vi. with basal area more than half of v.; flagellum three times as long as basal area. Rostrum pale at base, apex dark, reaching second coxæ. Cornicles short, not quite so long as basal area of antennal segment vi., swollen in middle, often much constricted at base; faintly imbricate. Cauda slightly longer than cornicles to about same length, triangulate, 3 hairs each side and 1 dorso-apical. Anal plate dark, more or less quadrilateral, with a few hairs. Legs rather long and thin; tibiæ hairy; femora pale at base. Eyes large, black. Veins brown; stigma paler greyish-brown; insertions green.

*Length* 1.9 to 2 mm.

*Apterous viviparous female.* Greyish-green, densely covered with a fine white mealy powder, 8 black transverse spots on each side, variable in size and form, sometimes broken in middle so as to form 4 spots; smaller black lateral spots; posteriorly these median black spots may fuse and form bars. Antennæ shorter

than body, dark, except greater part of segment iii. ; i. a little larger than ii. ; iii. about three times as long as iv. ; iv. and v.

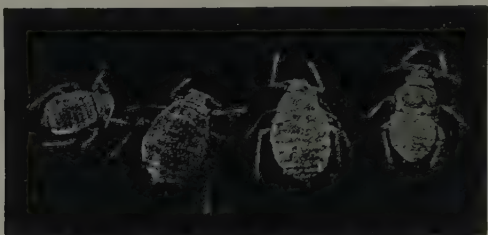


Fig. 19.—*Brevicoryne brassicae* Linnæus.  
Apterous females. (Much enlarged.) After Blakey.

about equal, in a few iv. is shorter ; vi. longer than iv. + v. ; basal area about one quarter of flagellum. Rostrum green at base, apex black, reaching to second coxæ, rather thin. Cornicles dark, short, narrowed at apices and in some at base ; faintly imbricate, not quite so long as antennal segment v. Cauda about

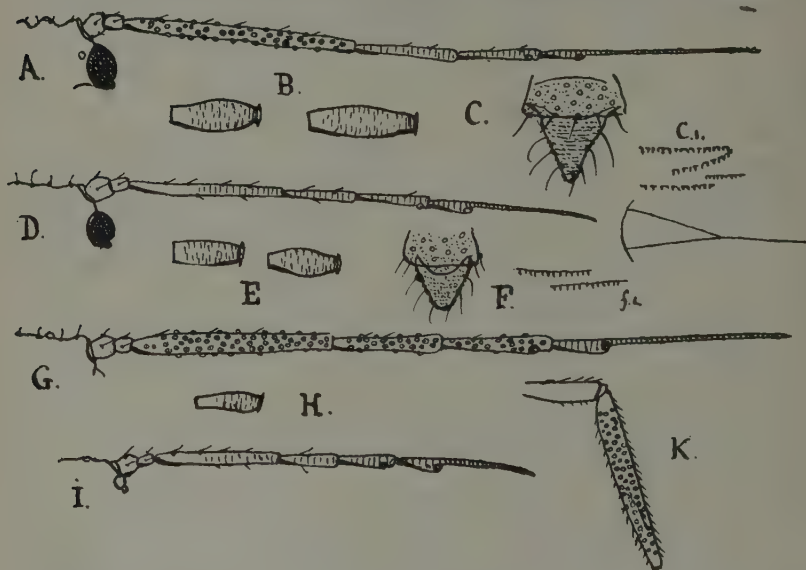


Fig. 20.—*Brevicoryne brassicae* Linnaeus.

Alate ♀, A. antenna, B. cornicles and C. cauda ; D.E.F. of apterous ♀ ; G. antenna, H. cornicle of alate ♂ ; Oviparous ♀, antenna I. ; hind tibia, K. c<sup>t</sup> and f<sup>t</sup>, caudal sculpture.



as long as cornicles, bluntly triangulate ; 3 hairs each side. Anal plate dark, more or less quadrilateral. Legs dark, almost black ; base of femora paler ; tibiæ hairy. Eyes black.

*Length* 2.1 to 2.4 mm.

*Oviparous female.* Apterous. Pale green to yellowish green. Antennæ shorter than body and darker ; segment i. slightly smaller than ii. ; iii. much longer than iv. and as long as or slightly longer than v. ; iv. and v. about equal ; vi. about equal to iv. + v., its basal area less than half flagellum. The green abdomen has a row of 7 to 8 black spots on each side and a double row of 5 dark patches along the centre of dorsum. Legs greenish to dusky ; hind tibiæ broadened, with numerous sensoria ; hairy. Cornicles short and dark, somewhat constricted at apices, a little shorter than cauda in some almost cylindrical. Cauda dusky, acuminate. Rostrum green, reaching second coxæ. Eyes black.

*Length* 2 to 2.3 mm.

*Male.* Alate. Antennæ much longer than body. Head blackish to blackish-green. Antennæ blackish. Thorax dark. Abdomen yellowish-green to greenish-brown. 4 black spots each side and a double row of 6 black patches along the centre. Cornicles and cauda dark. Legs dark, except base of anterior femora and to some extent the others. Wings large. Segment i. of antennæ equal to or a little larger than ii. ; iii. about twice as long as iv., with 50 to 66 sensoria all over it ; iv. and v. about equal ; iv. with 12 to 16 sensoria ; v. with 12 to 18 ; vi. a little longer than iii. Cornicles nearly as long as basal area of vi., much constricted at base. Cauda acuminate, longer than cornicles, with a few lateral hairs. Rostrum green, apex dark, reaching to just beyond second coxæ. Eyes large, black.

*Length* 1.2 to 1.4 mm.

FOOD PLANTS. All species of *Brassica* ; *Capsella bursapastoris* ; Charlock (*Sinapis arvensis*) ; Field Cress (*Isatis tinctoria*) ; *Diplotaxis tenuifolia* ; Radish (*Raphanus sativus*) ; *Bunias crucago* ; *Erysimum canescens* (Macchiati).

LOCALITIES. All over Great Britain ; Europe ; America ; British Columbia (Glendenning) ; Japan ; India (Das) ; Africa (Natal, Cape Colony, Orange River Colony ; Transvaal ; Zomba,

Nyassaland ; Nairobi (F.V.T.) ; Formosa at Sankakuho (7,500 feet) in Taichu-prefecture, 20 v. 24 (Takahashi).

*Observations.* A very abundant and harmful species which often ruins whole fields of Cabbage, Savoys, Cauliflowers, and especially Brussels Sprouts. It feeds both on and under the leaves ; it swarms on to the stems and between the Sprouts and also infests the seed pods of Cabbage, Radish, Turnips and Swedes. The attacked plants first show pale patches on the leaves, which become blistered and then curled. As the Aphides increase the whole plant may become a putrid swelling mass, due partly to decay, partly to the honey dew and excrement passed out by the insects. It appears first of all in May, usually starting in small clusters beneath the leaves, and by June alatae appear and they fly far and wide. Several generations occur and they may be found on the plants right into December. In November the alate males and oviparous females appear and the latter lay their eggs on the winter greens. The black eggs often occur in great masses. The Stem Mother appears hatched from the winter eggs in March.

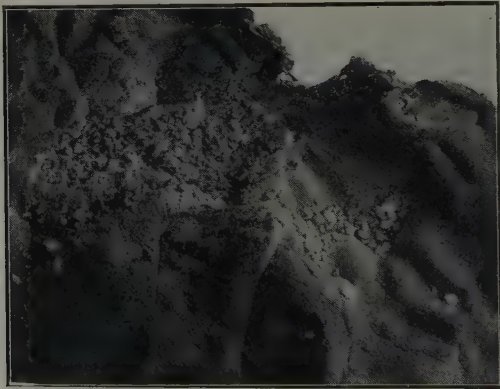


Fig. 21.—Mealy Cabbage Aphid (*Brevicoryne brassicae* Linn.).  
Colony of apterous ♀♀ on leaf.

This form will live for over a month and at first reproduces very slowly. The adults derived from these live about the same time and as the summer goes on increase more and more rapidly ; the greatest rate of increase is usually in September and October on into the early part of November. Sexual forms may occur as

early as October, but most in November and December. The ova seem to be laid indiscriminately beneath the leaves and on the stems, now and then they may be found on the upper surfaces. Herrick has traced twenty-nine generations in the year. They also pass the winter in the adult stage, specimens sent me from Cheshire in 1911 at the end of November lived through the winter, out of doors. This has also been observed in America (Herrick, Webster, Quaintance, etc.). It is very much subject to the attack of natural enemies, but they do not seem to control this pest. Many Hover Flies (*Syrphidæ*) in their larval stages prey upon them, especially *Syrphus ribesii*, *S. grossulariæ*, *S. balteatus* and *Catabomba pyrastris*. Buckton records the Aphidivorous Hymenoptera of the genera *Ceraphron*, *Trionyx* and *Coruna*. A common species is *Trionyx rapæ* Curtis (Farm Insects, p. 73), which in September often parasitised as much as nine-tenths of a colony. I have also found Lady Bird Beetles—*Adalia bipunctata* and *Coccinella 7-punctata* feeding on them, both in their larval and adult stages. Some of the *Chrysopa* or Lace-Wing Flies also devour them.

Genus HYADAPHIS Kirkaldy.

*Siphocoryne* Passerini.

Kirkaldy, Entomologist, XXXVII., 279 (1904); Passerini, Aphid. Italicæ, 8 (1863) (non, *Siphocoryne*, 1860).

Head without any frontal processes. Antennæ of 6 segments, with many circular sensoria in the alata giving a tuberculate appearance. Cornicles to some extent swollen, varying very much in the same colony. Cauda large, particularly in the apteræ, as long as or nearly so as the cornicles and broad. Venation normal. Males alate. Oviparous females apterous. Type *Aphis xylostei* Schrank. Kirkaldy renamed Passerini's genus *Siphocoryne*, type *xylostei* (1863), because Passerini had in 1860 set *nymphaeæ* as the type, the latter being the type of *Rhopalosiphum* Koch, the genus *Siphocoryne* thus sinks. The long cauda will at once separate this genus from *Rhopalosiphum*.

Three species occur in Great Britain:

*Hyadaphis xylostei* Schrank.

„ *sparganii* Theobald.

„ *coniellum* Theobald.

## KEY TO BRITISH SPECIES.

*Alate viviparous females.*

Abdomen green, unadorned ; cornicles dusky to black ; cauda dusky, often green at base ; iii. with 30 to 40 sensoria ; iv. with 6 to 8. *xylostei* Sch.

Dark ; black or brown, abdomen paler than thorax ; cornicles and cauda black ; iii. with 60 to 70 sensoria ; iv. with 18 to 24. *coniellum* Theo.

*Apterous viviparous females.*

Green of various shades ; cornicles black, a little longer than the cauda. *xylostei* Sch.

Very deep green to deep olive green ; head and thorax paler ; cornicles and cauda dark ; abdomen with 7 pairs of dark lateral spots ; 2 dark spots on pronotum ; cornicles more than half cauda. *sparganii* Theob.

Deep brownish-black ; cauda and cornicles black ; cauda not quite so long as cornicles. *coniellum* Theob.

## HYADAPHIS XYLOSTEI Schrank.

*Aphis xylostei* Schrank.

*Rhopalosiphum xylostei* Koch.

*Siphocoryne xylostei* Passerini.

*Rhopalosiphum pastinaceæ* Koch (non Linn.).

*Siphocoryne pastinaceæ* Buckton (non Linn.).

*Hyadaphis xylostei* Kirkaldy.

Schrank, Fn. Boic., II., 1, 107 (1801) ; Reaumur, Ins., III., 286 (1736) ; Kaltenbach, Mono. Pflanz., 14 (1843) ; Walker, Ann. Mag. N.H., IV., Se. 2, 43, 87 (1849) ; Koch, Die Pflanz., 33 (1854) ; Passerini, Aphid. Ital., 52, 53, n. 3 (1863) ; Buckton, Mono. Brit. Aphid., II., 35, pl. XLIV. and 24, pl. XLIII., figs. 5-7 (1877) ; Schouteden, Cat. Aphid. Belg., 229 (1906) ; Ferrari, Aphid. Liguriæ, 75 (1872) ; Boyer, Ann. Soc. Ent. Fr., X., 167 (1841) ; Gillette, Journ. Eco. Ent., IV., 322 (1911) ; Theobald, List. Aphid. Hastings, 7 (1912) ; Theobald, Entomologist, XLIV. (1911) ; Del Guercio, Redia, VII., 330 (1911) ; Kirkaldy, Entomologist, 37, 279 (1904).

*Alate viviparous female.* Head black. Thorax with dark pronotal band ; thoracic lobes and scutellum black. Head and

thorax rather broad. Abdomen green, unadorned, with a depressed line on each side. Antennæ shorter to about same length as body, black; segments i. and ii. about equal; i. wider than ii.; iii. as long as vi.; with 30 to 40 sensoria evenly scattered over whole length; iv. about one-third of iii., with 6 to 8 sensoria; v. a little shorter than iv.; vi. as long as iii., its basal area about as long as v. Median and lateral tubercles of head rather prominent. Cauda dusky, green or dusky at base, nearly as long as cornicles, acuminate, with a few long lateral and supra-caudal hairs. Cornicles dusky to black, swollen on apical two-thirds or half; apex trumpet shaped, with a few transverse striæ; the narrow basal area corrugated. Legs brownish-green to brownish-yellow; most of femora on apical area and apices of tibiæ and the tarsi dark. Wing insertions pale yellowish-green; stigma grey; veins brown.

*Length* 1.6 to 1.9 mm.

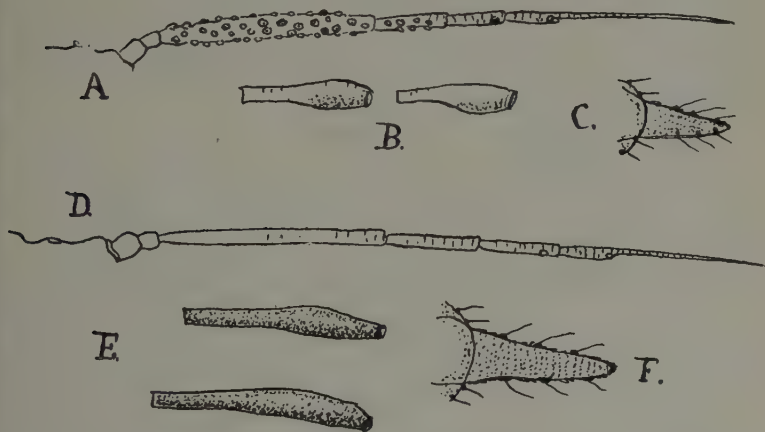


Fig. 22.—*Hyadaphis xylostei* Schrank.

A. Antenna of alate ♀; B. Cornicles; C. Cauda; D.E.F. of apterous ♀.

*Apterous viviparous female.* Green of various shades; widest just above the cornicles, domed, segmentation more or less distinct. Antennæ shorter than body; segments i. and ii. dark, also v. and vi., remainder green; iii. as long or slightly longer than vi.; iv. about one-third of iii.; v. shorter than iv. and about as long as basal area of vi. Cornicles black,

swollen towards the ends, which are constricted; the trumpet shaped opening being small; a little longer than cauda; a few transverse striæ at apices. Cauda rather long, 3 hairs each side and 1 supra-caudal. Legs green; femora dusky green on hind legs; apices of tibiæ and the tarsi dark.

*Length* 1.5 to 1.8 mm.

FOOD PLANTS. Honeysuckles (*Lonicera xylosteum* and *L. periclymenum*).

LOCALITIES. Hereford, 17 vii. 11; Kingston-on-Thames, 7 vi. 94; Cambridge, 20 vii. 89; Great Staughton, Hunts., 2 viii. 90; Wye, vi. and vii. 1911 to 1924; Okehampton, Devon, 7 viii. 12; Hastings district (F.V.T.); Tregarth, North Wales (C. L. Walton); Swordale, Evanton, Ross-shire, N.B., 2 vii. 17 (D. Jackson); Edgeware and Wimbledon, vii. (Buckton). Whixall, Shropshire; Burton-on-Trent; Barmouth; Lynmouth; Birmingham; Torquay; various districts in Bucks. and Herts. Aberdeenshire abundant when it occurs (F. Laing).

Italy (Passerini and Del Guercio).

*Observations.* Evidently a fairly common species in Great Britain. I have found it in dense masses amidst the flower stalks and under the leaves of the Honeysuckles, especially in gardens, where it produces a quantity of very sticky honey dew, to which the excreta sticks and on which the Black Soot Fungus flourishes. Strong nicotine washes are necessary to control this species and then the plants should be well sprayed with quassia and water to clean off the refuse and honey dew on the foliage.

*H. xylostei* Schrank is considered by Gillette to be the same as Linnæus' *pastinacæ*. The European *xylostei* does not come in the same genus as *pastinacæ*, which is a *Cavariella*. Gillette points out that the *xylostei* of Schrank may be the wintering form of this *pastinacæ*, passing the fall, winter and spring on *Lonicera* and the summer on *Umbellifera*. Koch's *pastinacæ*, which has no supra-caudal process is probably the summer form of Schrank's *xylostei* in Europe, just as Gillette's *pastinacæ* may be in America.

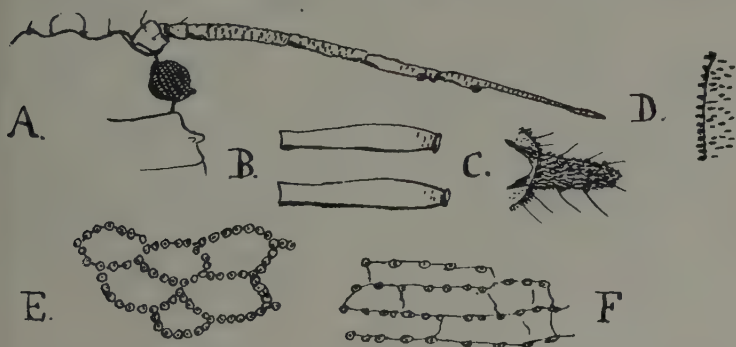
Gillette and Bragg (Canad. Ent., 50, 3, 94 (1918) have renamed Essig's *pastinacæ*, *Hyadaphis essigi*.



## HYADAPHIS SPARGANII Theobald.

Ent. Mo. Mag., LXI., 74 (1925).

*Apterous viviparous female.* Deep green to olive green, with darker mottlings; head and thorax paler. Legs dark, rather thick and shortish; femora pale, apices darkened. Antennæ brown, base of segment iii. pale; i. and ii. dark. Eyes black. Cauda short and dusky. Cornicles prominent; dark, especially at apices. On the abdomen are 7 pairs of dark spots at the sides in the carinæ and the segments of the whole body are markedly defined; there are also two dark spots on the pronotum. Antennæ much shorter than body; segment i. much wider and slightly longer than ii.; iii. a little longer than iv.; iv. very little longer than v.; flagellum nearly four times as long as basal area. Cornicles nearly as long as segment iii. of antennæ, much thicker, rather swollen on apical half and constricted at apices. Cauda not quite half cornicles, bluntly acuminate; 3 hairs each side. Legs rather

Fig. 23.—*Hyadaphis sparganii* Theobald.

A. Head and antenna of apterous ♀; B. Cornicles; C. Cauda; D. Spinose integument of body; E. Cuticle in mid body; F. Posterior cuticle.

short and thick; tibiæ very hairy, somewhat curved; hind pair much longer than others. A small papilla each side of pronotum and one between second and third pair of legs. Cuticle in mid-region markedly sculptured with hexagonal markings; caudad the ornamentation becomes more in the form of lateral striae composed of circular dots, connected by fine lines; the whole cuticle spinose.

Length 2.2 to 3 mm.

FOOD PLANTS. *Sparganium simplex* and *Sparganium sp?*

LOCALITIES. Wye, 20 vii. 11 (F.V.T.); Chiothlyn, Denbyshire, viii. 25 (Dallman).

*Observations.*—I found a colony of this very marked Aphid in 1911, a few apterous females and many larvæ. Recently Mr. A. Dallman has sent me a small colony from North Wales. The structure of the head and cornicles make it approach *Rhopalosiphum*, but I think it comes nearest to *Hyadaphis*. It appears to be a rare species as I have frequently searched for it but have been unable to find any more.

HYADAPHIS CONIELLUM Theobald.

Ent. Mo. Mag., LXI., 75 (1925).

*Alate viviparous female.*—Dark; abdomen slightly paler than thorax, a deep brownish-black. Cauda and cornicles black. Antennæ dark, base of segment ii. paler, shorter than body; segment i. wider but no longer than ii.; iii. long, nearly as long as iv. + v., somewhat enlarged, with 60 to 70 sensoria; iv. with 18 to 24 sensoria and longer than v.; basal area of vi. about two-thirds of v.; flagellum not quite so long as iv. + v. Rostrum reaches to nearly second coxæ. Cornicles thick, swollen in middle, apices constricted. Cauda as long as cornicles, much wider at base, bluntly acuminate, 3 hairs each side. Legs and wings normal.

*Length* 1.8 to 2.2 mm.

*Apterous viviparous female.*—Deep brownish black; legs, cornicles and cauda black; antennæ black at base and apex of segments iii. and iv., base of v. pallid; i. much wider than ii.; iii. long, much longer than iv. + v.; iv. a little longer than v.; base of vi. slightly shorter than v.; flagellum as long as iv. + v. Rostrum, thick, reaching to or nearly to second coxæ. Cornicles thick, expanding on apical half, narrowed at apices, a few large imbrications; base striate. Cauda thicker than cornicles, not quite so long; blunt; 3 hairs each side. Legs rather short and thick; a few hairs on tibæ.

*Length* 2 to 2.4 mm.

*Male.* Alate. Dark blackish-brown, abdomen slightly paler than large head and thorax. Antennæ, cauda and cornicles dark. Legs pale yellowish-brown, apices of femora and tibiæ and the tarsi dark. Antennæ a little longer than body; segment i. about same length but wider than ii.; iii. not quite twice as long as iv., with 60-70 circular sensoria, giving a marked tuberculate appearance; the whole segment somewhat swollen; iv. a little longer than v., with 10 to 16 sensoria; v. with 10 to 13 sensoria; vi. with basal area about two-thirds of v.; flagellum as long as iv. + v. Eyes large. Cornicles short, as long as basal area of antennal segment vi., clavate, striate at narrowed base, the sides crenulated. Cauda triangulate, a little shorter than cornicles, 4 hairs each side, curved apically. Rostrum reaches to or nearly to second coxæ. Tibiæ and apices of femora with fine short hairs. Claspers black. Penis pale.

*Length* 1.4 to 2 mm.

FOOD PLANT. Common Hemlock (*Conium maculatum*).

LOCALITY. Althorpe, Lincolnshire, 27 ix. 24.

*Observations.* Described from several males, many alate viviparous females and apterous viviparæ. The specimens were sent me by Mr. A. A. Dallman. They were swarming on the seedheads of the common Hemlock, the heads being a blackened mass of insects. Two or three were parasitised.

## Genus RHOPALOSIPHUM Koch.

*Siphocoryne* Passerini.

*Rhopalisiphon* Scudder.

*Colorado* Wilson.

*Siphonaphis* V. de Goot.

*Stephensonia* Das ?.

Koch, Die Pflanz. Aphid., 23 (1854); Gerstæcker, Bericht. f., 1854, 162 (1856); Passerini, Gli Afidi, 28 (1860); Scudder, Nomenclator Zoologicus (1882); Wilson, Ann. Soc. Ent. Am., 3, 323 (1910); Van der Goot, Beiträge, Kennt. Holl., Blattläuse, 238 (1915); Das, Mem. Ind. Mus., 6, 175 (1918).

Head without any prominent frontal processes. Antennæ of 6 segments, with circular sensoria. Cornicles moderately long

and narrow, slightly swollen towards the apical region. Cauda not as long or as broad as cornicles, but to some extent elongate. Venation normal. Males alate. Oviparous females apterous. Koch who founded this genus, included in it many forms, some coming in the Macrosiphini, others in the Aphidini. He included such diverse species as *calthæ* and *nymphææ*, the first comes in the genus *Rhopalosiphoninus*, whilst the latter was set by Gerstæcker as the type of Koch's *Rhopalosiphum*. Passerini in 1860 set Sulzer's *persicæ* as the type, evidently not knowing Gerstæcker's paper and in 1863 he founded the genus *Siphocoryne* on Linnæus' *nymphææ*, overlooking the fact that it was the type species of *Rhopalosiphum*. In 1863 Passerini placed *nymphææ* in *Rhopalosiphum*, but set *dianthi* as the type of the genus and he used *Siphocoryne* with *xylostei* Schrank as the type. Kirkaldy then renamed *Siphocoryne* with *xylostei* as the type of *Hyadaphis*, which genus is retained. Van der Goot's *Siphonaphis* of course sinks as he made *nymphææ* the type species. Wilson made *rufomaculatus* type of his genus *Coloradoa*; Baker has sunk this as a synonym. I have not this species in my collection. Das's *lahorensis*, type of his genus *Stephensonia* is also a *Rhopalosiphum*, as far as I can see from my Egyptian specimens.

#### BRITISH SPECIES OF *Rhopalosiphum*.

*Rhopalosiphum nymphææ* Linnæus.

- „ *eriphori* Walker.
- „ *fæniculi* Passerini.
- „ *alboapicalis* Theobald.
- „ *rumicis* Theobald.
- „ *prunifoliæ* Fitch.

#### FOOD PLANTS OF *Rhopalosiphum*.

<i>Alisma plantago</i>	R. <i>nymphææ</i> Linn.
<i>Avena fatua</i>	R. <i>prunifoliæ</i> Fitch.
<i>Acorus calamus</i>	R. <i>nymphææ</i> Linn.
<i>Azolla filiculoides</i>	R. <i>nymphææ</i> Linn.
<i>Bromus</i> sp.	R. <i>prunifoliæ</i> Fitch.
<i>Calla</i> sp.	R. <i>nymphææ</i> Linn.
<i>Cratægus oxyacanthæ</i>	R. <i>prunifoliæ</i> Fitch.
<i>Elodea canadensis</i>	R. <i>nymphææ</i> Linn.

<i>Fontederia cordata</i>	R. nymphææ Linn.
<i>Eriophorum</i>	R. eriophori Wlk.
<i>Fœniculum vulgare</i>	R. fœniculi Pass.
<i>Hordeum</i> sp.	R. prunifoliæ Fitch.
<i>Holcus mollis</i>	R. prunifoliæ Fitch.
<i>Hydrocharis morus-ranæ</i>	R. nymphææ Linn.
<i>Hydrocotyle vulgaris</i>	R. nymphææ Linn.
<i>Juncus</i> sp.	R. nymphææ Linn.
<i>Lemna gibba</i>	R. nymphææ Linn.
<i>Malva</i> sp.	R. alboapicalis Theo.
<i>Melumbrium speciosum</i>	R. nymphææ Linn.
<i>Myriophyllum verticillatum</i>	R. nymphææ Linn.
<i>Nymphæa alba</i>	R. nymphææ Linn.
„ <i>lutea</i>	R. nymphææ Linn.
„ <i>odorata</i>	R. nymphææ Linn.
<i>Najas flexilis</i>	R. nymphææ Linn.
<i>Nelumbo nucifer</i>	R. nymphææ Linn.
<i>Potamogeton natans</i>	R. nymphææ Linn.
<i>Pontoderia</i> sp.	R. nymphææ Linn.
<i>Philotria canadense</i>	R. nymphææ Linn.
<i>Pyrus malus</i>	R. nymphææ Linn.
<i>Pyrus pyri</i>	R. nymphææ Linn.
<i>Prunus</i> sp.	R. nymphææ Linn.
<i>Ranunculus sceleratus</i>	R. nymphææ Linn.
<i>Richardia africana</i>	R. nymphææ Linn.
<i>Sagittaria sagittifolia</i>	R. nymphææ Linn.
<i>Salvia natans</i>	R. nymphææ Linn.
<i>Saururus cernuus</i>	R. nymphææ Linn.
<i>Scirpus lacustris</i>	R. nymphææ Linn.
<i>Sparganium ramosum</i>	R. nymphææ Linn.
<i>Stratiotes</i> sp.	R. nymphææ Linn.
<i>Triticum</i> sp.	R. prunifoliæ Fitch.
<i>Typha latifolia</i>	R. nymphææ Linn.
<i>Utricularia vulgaris</i>	R. nymphææ Linn.

# KEY TO BRITISH *Rhopalosiphum*.

## *Alate viviparous females.*

More or less metallic brassy green, olive green, shiny green.  
Cornicles pale yellow to reddish-yellow, clavate; cauda

dark ; segment iii. of antennæ with 20-24 sensoria ; iv. with 7 to 8. *nymphææ* Linn.

Abdomen red, paler in front, with darker markings ; cauda red ; iii. with 35-46 sensoria ; iv. with 11 to 14 ; cornicles black. *eriophori* Wlk.

Abdomen pale yellow with dark dorsal irregular patch behind (or 3 broad bands), 2 dark transverse bars in front and traces of 2 caudad, obscure dusky lateral spots. Head dark. Antennæ with white apex ; iii. with 18 to 26 sensoria ; iv. with 18-20 ; v. with 1 to 3 + 1 ; cauda and cornicles pale yellow. *alboapicalis* Theobald.

Dark, but abdomen paler than head and thorax ; cauda and cornicles dark ; iii. with 67-70 ; iv. 2 sensoria ; cornicles rather long. *rumicis*.

Abdomen shiny green, a deeper green median stripe, 4 pairs of black lateral spots. Cornicles rather short, dusky to deep brown ; cauda green ; iii. with 17-25 ; iv. 7-14 ; v. 0-1 + 1. *prunifoliæ*.

Abdomen all green ; head black ; cauda green. *fæniculi*.

#### *Apterous viviparous females.*

Dark metallic green, olive green or brassy, with pale green patches at sides of abdomen, others with deep coloured markings. Cornicles grey to deep blackish-green.

*nymphææ*.

Jet black, with large flaky white apical tuft of tomentum ; cornicles black, very thick. *eriophori*.

Yellowish-green, with irregular grass-green stripe along dorsum and one each side, the median stripe may be broken into spots ; often rusty or deep green areas at base of cornicles. Cornicles pale, slightly irregular. *prunifoliæ*.

All green ; cornicles green, slightly curved. *fæniculi*.

#### RHOPALOSIPHUM NYMPHÆÆ Linnæus.

*Aphis nymphææ* Linnæus.

*Aphis plantarum-aquaticum* Fabricius.

*Rhopalosiphum nymphææ* Koch.

*Rhopalosiphum najadum* Koch.

*Rhopalosiphum alismæ* Koch in litt.

*Aphis butomi* Schrank.



*Aphis aquaticus* Jackson.

*Siphonaphis nymphææ* V. d. Goot.

*Nymphæifex* Amyot.

*Aphis prunaria* Walker.

*Aphis prunorum* Dobrovliansky.

Linnaeus, Syst. Nat., II., 714, 10 (1767); Fn. Suec., 983 (1789); Fabricius, Syst. Rhyng., 297, 18 (1802); Ent. Syst., V., 214, 18 (1794); Mant. Ins., II., 315, 17 (1807); Fonscolombe, Ann. Soc. Ent. Fr., X., 166, 5 (1841); Amyot, Ann. Soc. Ent. Fr., n. Se., V., 478 (1846); Schrank, Fn. Boic., II., 1, 117 (1801); Kaltentbach, Mono. Pflanz., 104 (1843); Walker, Ann. Nat. Hist., Se. 2, V., 26, 75 (1850); Walker, List. Homop. (B.M.), IV., 984 (1852); Koch, Die Pflanz., 26 (1854); Passerini, Aphid. Ital., 21, 5 (1863); Ferrari, Aphid. Liguriæ, 217, 9 (1872); Buckton, Mono. Brit. Aphid., II., 12, pl. XLI. (1877); Walker (*prunaria*), Zool., VI., 2250 (1848); Ann. Mag. Nat. Hist., VI., Se. 2, 121, n. 100 (1850); Schouteden, Mém. Soc. Ent. Belg., XII., 236 (1906); Riley, Insect Life, V., 236 (1893); Osborn and Sirrine, Proc. Iowa, Acad., Se. I., 3, 98 (1892); Insect Life, V., 236 (1893); Cowen, Bull. Agri. Exp. Sta., Colo. Tech., Se. I., 123 (1895); Cockerell, Science, XXII., 764 (1905); Jackson, Ohio Nat., VIII., 243 (1908); Davis, Ent. News., XXI., 245 (1910); Theobald, Entomologist, XLIV., 18 (1911); Essig, Pom. Coll. Journ. Ent., IV., 3, 793-797 (1912); Patch, Maine Agri. Exp. Sta. Bull., 202 (1912); Dobrovliansky, Husbandry, Kiev. (1915); Patch, Science, XLII., 164 (1915); Van der Goot, Kennt. Holl. Blatt., 239 (1915) and Cont. Fn. Ind. Neerland, I. iii. 69 (1916); Matsumura, Journ. Coll. Agri., Tohoku Imp. Univ., VII., 359 (1917); Das, Aphid. Lahore Mem. Ind. Mus., IV., 191 (1918); Takahashi, Aphid. Formosa, Pt. I., 33 (1921); Essig and Kuwana, Proc. Calif. Acad. Sci., VIII., 3, 62, fig. 12 (1918); Glendenning, Proc. Ent. Soc. Brit. Columbia, No. 21, 41 (1924); Moreira, Pulgões do Brasil, 21 (1925).

*Alate viviparous female.* Head and thoracic lobes black. Abdomen various shades of shiny green to brassy green or olive green (the metallic tint seems to vary according to the host plant). Antennæ much shorter than body, black, except base of segment iii., which is green; in some antennæ all deep green; segment i. broader but about same length as ii.; iii. long, but shorter than

vi., with 20 to 24 sensoria over whole length; iv. about two-thirds of iii., with 7 to 8 sensoria; v. shorter than iv.; vi. about as long as iii. + iv. Cornicles pale yellow to pale reddish yellow, apices dusky, some all dusky, about one-sixth length of body; swollen towards apices. In a few cases cornicles are deep olive

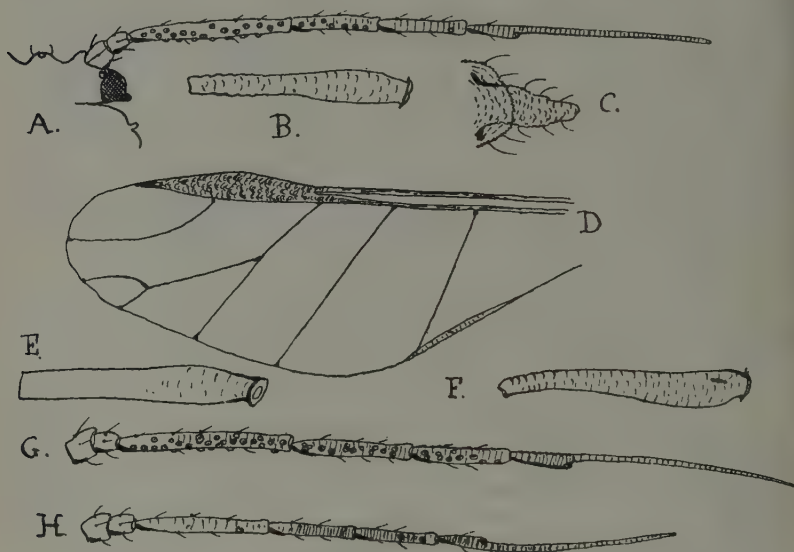


Fig. 24.—*Rhopalosiphum nymphæa* Linnæus.

A.B.C.D. Alate ♀; antenna, cornicle, cauda and fore wing; E.H. Apterous ♀, cornicle and antenna; G. Antenna of male; F. Cornicle.

green. Cauda blackish to deep green. Legs deep blackish-brown to olive green; tibiæ often paler on basal two-thirds. Walker says covered with a white bloom; I have seen this once in specimens taken on *Lemna*, but not on those from *Alisma* or *Butomus*. Rostrum reaches to or just beyond second coxæ, rarely to third. Wings rather short and broad; insertions pale green or yellow; cubitus and stigma brown. A lateral papilla each side of pronotum.

Length 1.8 to 2 mm.

*Apterous viviparous female.* Various shades of green, mostly dark, often metallic hue, rich olive-green, now and then deep green

and brassy. Antennæ thick, shorter than body, black to dusky grey-green; base of segment iii. paler; i. broader than ii.; iii. longer than iv.; iv. and v. equal; vi. with long flagellum, as long as basal area + iv. + v. Head, legs, cornicles deep grey to deep blackish-green. Abdomen with pale green patches at sides, in others with deep coloured markings and some as Walker describes, with a red spot each side.

*Length* 1.6 to 2.5 mm.

*Male.* Alate; smaller and narrower than alate female. Eyes large. Head black, shiny, broader than prothorax. Abdomen dark green in middle, sides yellow, green bands across. Rostrum reaches past second coxæ. Prothorax with black band in front and 2 dark spots behind. Antennæ black, as long as body;

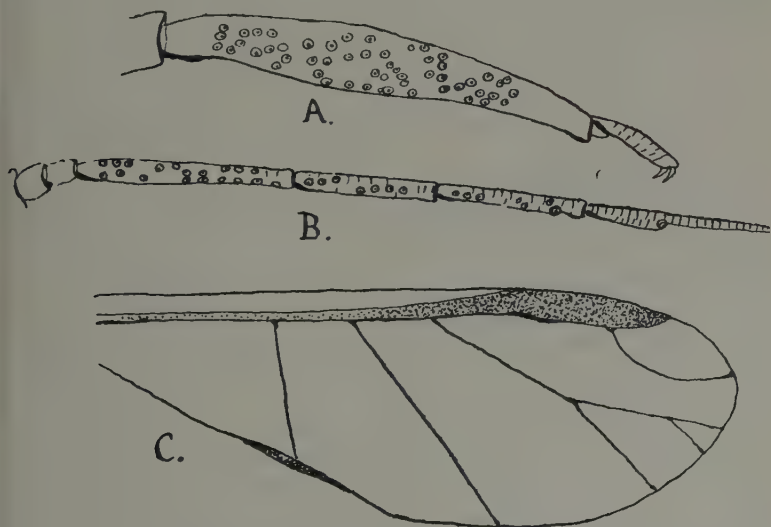


Fig. 25.—*Rhopalosiphum nymphæ* Linn.

A. Hind tibia of oviparous ♀; B. and C. Antenna and wing of ♂.

segment i. broader than ii.; iii. longer than iv. with 30 to 35 sensoria over whole length, about half to three-quarters of vi.; iv. a little longer than v., with 18 to 20 sensoria; v. with 8 to 12; basal area of vi. about half of v.; the flagellum not quite so long as basal area + iv. + v. Cornicles clavate on distal half which

is dark brown, base colour of body, apex black. Cauda edged with black.

Length 1.5 to 2 mm.

FOOD PLANTS. *Nymphæa alba*; *N. lutea*; *N. odorata*; *Alisma plantago*; *Potamogeton natans*; *Sagittaria sagittifolia*; *Utricularia vulgaris*; *Hydrocotyle vulgaris*; *Butomus umbellatus*; *Fontederia cordata*; *Hydrocharis morusranæ*; *Lemna gibba*; *Pontederia*; *Stratiotes* sp.; *Azolla filiculoides*; *Marsilea quadrifolia*; *Salvia natans*; *Ranunculus sceleratus*; *Typha latifolia*; *Sparganium ramosum*; *Acorus calamus*; *Saururus cernuus*; *Prunus* spp. including Peach and Plum. Various other host plants are recorded in America. In Japan *Sagittaria*, *Nymphæa* and *Nelumbo nucifer* (Matsumura and Takahashi). On *Lemna*, *Melumbium speciosum* and *Scirpus lacustris* in India (Das). Java (V. d. Goot) on *Cryptocoryne ciliata*.

LOCALITIES. Wye, 2 vi. 10; 7 vii. 11; Hythe; Romney Marsh, vi. to viii. 12; Oxshott Common, Surrey, 12 vi. 88; Godalming, 6 vi. 13 (F.V.T.); Kew Gardens, 20 iii. 18 (Fryer); Woodchurch, Norfolk, 5 x. 12 (Burrell); Hampton Court and Wanstead (Buckton); Belgium (Schouteden); Italy (Passerini and Ferrari); Germany (Koch, Kaltenbach); Russia (Mordwilko); Bruges (F.V.T.). British Columbia (Glendenning). In America: Ohio (Jackson); Iowa (Osburn); Colorado (Cowen); Illinois (Davis); Missouri (Monell, Davis). Brazil (Moreira). Japan (Matsumura); Formosa at Taihoku and Kwannonzan (Takahashi). India (Das); New Zealand on Plums (Laing). Java (V. d. Goot).

*Observations.* Sometimes very abundant on many water plants and in certain years it increases with great rapidity. It attacks the leaves, blossoms and stalks. It appears to do a certain amount of damage in America (Jackson, 1908, and Davis, 1912) under glass. I have seen it swarming on various ornamental *Nymphæa* and much spoiling them. Buckton records it at Hampton Court as occasionally being far too common and that it attacks the leaves of the White Water Lilies in some years seriously on large sheets of water, that they disappear for whole years. It is subject to great variation in colour and not only when occurring on different plants but even in the same colony. Walker refers to two varieties, one reddish-green with black mottlings,

the other nearly black. Buckton speaks of the apterous females as being "rather glaucous," and says that some winged forms are darker than others. Amongst a consignment sent me from Norwich in October, 1912, I found many alate females and also a winged male, described here; the claspers show prominently, but the penis is not exerted. On *Alisma* they attack the flower buds and stems; on *Butomus* the leaves as well; on Water Lilies the flowers are often smothered with a mass of insects and also the tops of the leaves; in *Potamogeton* they produce a marked rolling of the leaves. Dobrovliansky says experiments have shown that his *Aphis prunorum* is identical with this insect. Patch also finds that this well known water plant Aphid also attacks Plums, living on the shoots and ventral surface of the leaves. The leaves are not deformed, but there is a tendency to feed on the fruit. The spring migrants from the Plums pass to the Water Weeds and return to the Plums to deposit their eggs in the autumn. Walker's *Aphis prunaria* from Plums is this species.\*

RHOPALOSIPHUM ERIOPHORI Walker.

*Aphis eriophori* Walker.

*Hyalopterus eriophori* Buckton.

Walker Ann. Nat. Hist., Se. 2, II., 46 (1848); Buckton, Mono. Brit. Aphid., II., 117 (1877); Jackson, Scottish Nat., II., 96 (1922).

*Apterous oviparous female.* Jet black. Antennæ very short, brown, base of segment iii. pale. Cornicles black. A very large tuft of flaky white tomentum at the apex of body. Venter brownish-black. Legs dark brown, base of femora and tibiæ paler. Antennæ of 6 segments, only reaching to second pair of legs; segment i. larger than ii.; iii. larger than iv., not quite so long as iv. + v., with 1 to 6 round sensoria on basal half; iv. very little longer than v.; vi. a little longer than iv. + v., its basal area thick, about one-quarter of flagellum, a few rather long hairs on segments iii. to v. Rostrum thick, reaching to second coxæ. Cornicles very thick, about as long as segments iii. and iv. of

\* A slide of *Aphis prunaria* Walk. on Sloe (*Prunus spinosa*) is in the British Museum and shows that the species is undoubtedly the same as *Rhopalosiphum nymphææ* (L.). A similar slide is also in the Hope Museum, Oxford (F. Laing).

antennæ, imbricated, imbrications marked ; irregular in form, constricted at apices and swollen towards apices. Cauda blunt, 2 hairs each side. Anal plate bluntly triangulate, with a few hairs. Skin marked with a net-work of areas with dotted lines ; body hairs rather long and stiff and far apart, the spaces between with short, blunt processes. Legs rather short and thick, with many hairs on tibiæ ; posterior tibiæ rather thickened, but not so thick as the femora ; no sign of sensoria.

Length 1.8 to 2 mm.

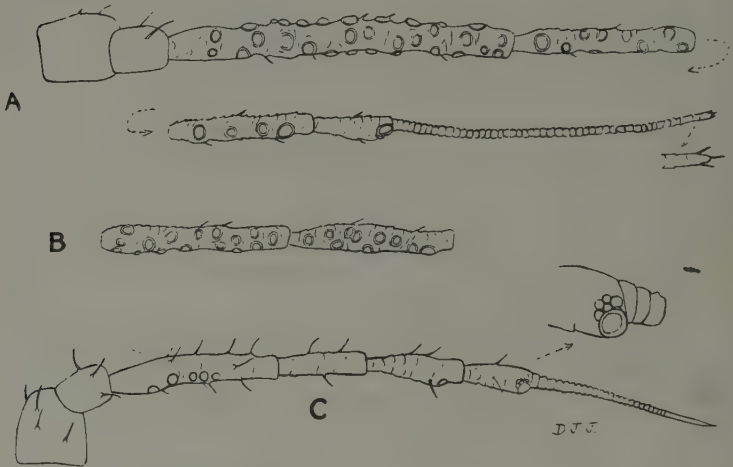


Fig. 26.—*Rhopalosiphum eriophori* Walker.

A, Alate ♀ antenna : B, Segments iv. and v. of ♂ ; C. Apterous oviparous ♀ antenna (after Miss Jackson).

*Alate viviparous female.* Apparently same colour as male. Antennæ shorter than body ; segment i. larger than ii. ; iii. nearly twice as long as iv. with 35 to 46 sensoria over whole length ; iv. longer than v., with 11 to 14 sensoria ; vi. with long flagellum. Eyes and ocular process prominent. Cornicles similar to male, irregular in shape. Cauda and anal plate rather small. Wings normal.

Length 2 mm.

*Apterous viviparous female.* Antennæ much shorter than head and thorax, only just reaching second legs ; segment i. wider than ii. ; iii. nearly as long as iv. + v., with 1-3 double contoured round



sensoria near base ; iv. and v. about equal ; vi. with base two-thirds of v., flagellum four times base ; primary sensoria normal ; 5-6 stiff hairs on iii. ; 3 on iv. ; 3 on v. and 1 near sensorium ; 1 on base of vi. Front of head flat ; head hairy. Eyes moderate, ocular process large. Rostrum rather thick, just reaching second coxæ ; apical segment very little longer than penultimate. The dark cornicles thick, irregular in form, cylindrical, enlarged basally, some swollen in middle and constricted before the flared apex : markedly imbricate. Cauda much paler than cornicles, about one-half their length, very spinose, two hairs each side and 1 dorso-apical. Legs rather short and thick ; tibiæ with many spine-like hairs, a few on femora. Cuticle with marked reticulation, the lines of fine dots. A few stiff hairs all over body. Form elongate oval to almost linear and *Sipha*-like.

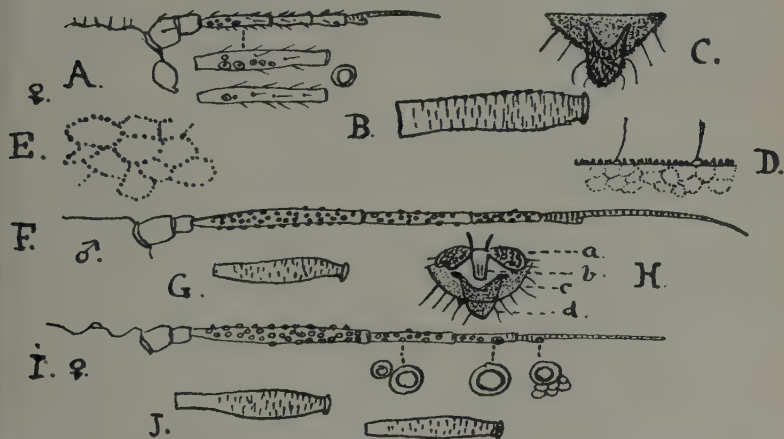


Fig. 27.—*Rhopalosiphum eriophori* Walker.

A.-E. Oviparous ♀ ; A. Head and antenna ; B. Cornicle ; C. Cauda ; D. Body cuticle ; E. Same further enlarged ; F.G.H. Male ; F. Antenna ; G. Cornicle ; H. Sexual appendages ; a. Claspers ; b. Penis ; c. Anal plate ; d. Cauda ; I.J. Alate ♀, antenna and cornicles.

*Male.* Alate. Head and thorax brownish-black. Abdomen light red in front, dark red behind ; anterior one-third of abdomen marked by two conspicuous transverse lines of darker red colour, one in the middle of each segment, remaining two-thirds of abdomen uni-colourous deep red. Cauda red ; cornicles black ;

venter dark red; venter of thorax black. Antennæ brown. Fore legs ochreous, apices of femora and tibiæ and the tarsi brown; mid legs and hind legs similar, but with femora entirely dark brown except at base; tibiæ with deep brown apices; tarsi dark. Antennæ of 6 segments not so long as body; segment i. larger than ii.; iii. as long as iv. + v., with 40 to 48 round sensoria of two sizes over whole length; iv. a little longer than v., with 15-20 sensoria; v. with 12 to 15; vi. a little longer than iv. + v., flagellum long, basal area about half of v.; a few scattered hairs, also some on head. Rostrum reaches half way between first and second coxæ. Cauda acuminate, 2 hairs each side. Anal plate, broad and rounded, with several hairs. Claspers small; penis short and blunt. Cornicles much as in oviparous female, but more slender. Legs longer.

*Length* 1.7 to 2 mm.

*Nymph.* Plum colour to pale pinkish-purple, dusted with tomentum and with a large bunch of flaky white tomentum at

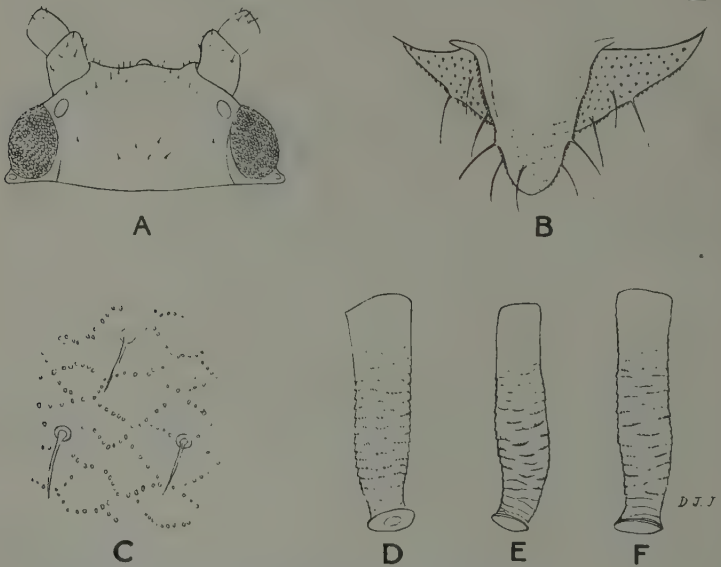


Fig. 28.—*Rhopalosiphum oriophori* Walker.

A. Head of alate ♂; B. Cauda and anal plate of alate ♀; C. Cuticle of apterous ♀; D. Cornicle of apterous ♀; E. and F. of alate ♀.

apex of body. Cornicles black. Legs and antennæ dingy greyish-ochreous. Wing cases brown. One nymph was brown, with spotted cornicles, ochreous and brown.

*Larvæ.* Pale pinkish-yellow or pale pinkish-purple, sometimes pale ochreous, otherwise like the nymphæ.

FOOD PLANT. Cotton Grass (*Eriophorum vaginatum* and *E. angustifolium*). ? *Carex* sp.

LOCALITIES. Inversan, Inverness-shire, N.B., 20 ix. 20 (D. Jackson); Llangammarch, Wales, 15 x. 25; Loch Awe, Argyleshire (F. Laing); Sally Gap, Wicklow Mountains, Ireland (Haliday-Walker); 16 viii. 47.

*Observations.* Walker describes the apterous viviparous female as follows:—"Elliptical, rather narrow, slightly convex, dark lead colour, somewhat hairy, a spot of white floccus near tip of abdomen; antennæ less than half length of body; fourth segment half length of third; fifth shorter than fourth; sixth half length of fifth; mouth reaches mid coxæ. Nectaries  $\frac{1}{7}$  length of body. Legs slender, slightly hairy."

Buckton places this in *Hyalopterus* and describes the apterous female as follows:—"Body hairy, long, oval, lead-gray, with a white floccus at the tip of the abdomen. Antennæ about two-fifths the length of the body. Cornicles moderately long. Legs rather short. The winged form unknown. Taken abundantly on *Eriophorum vaginatum* at Sally Gap, Wicklow Mountains, Ireland, in August at more than 1,600 feet above sea level." Buckton's slide which he received from Walker is now in the British Museum. A true Walkerian slide is also in the same collection. The specimens I have seen taken by Miss Jackson are no doubt the same and the long cornicles in the alate females and males place it in *Rhopalosiphum*, certainly not *Hyalopterus*.

Miss Jackson gives the following notes. "I found a few specimens of a black aphid on the leaves of the Bog Cotton Grass, growing in marshy moorland ground. It was found towards dusk. Mostly nymphæ and alatæ occurred and only a few larvæ. At the base of the plant close to the wet peat, between the sheathing leaves the insect had been breeding in numbers, the stems and soil around being covered with the cast skins of the aphides.

It was interesting to note that the aphides occurred only on one patch of Bog Cotton, and in this patch the leaves had all turned red. Scarcely any aphides were to be found on the plants still green."

A slide of apterous viviparæ in the British Museum taken by Mr. E. E. Green, in Wales, has on the label "on ? *Carex* sp."

**RHOPALOSIPHUM ALBOAPICALIS** Theobald.

*Siphocoryne alboapicalis* Theobald.

Entomologist, XLIX., 182 (1916).

*Alate viviparous female.* Pale yellow; head brown to black, with dark median line. Eyes dark. Thoracic lobes dark brown also scutum, metanotum and a dusky pronotal band. Abdomen with a dark dorsal irregular patch behind, sometimes showing as 3 broad irregular bands, two dark transverse bars in front and traces of 2 behind the dark patch; 4 or 5 obscure dusky spots on each side. Cornicles and cauda pale yellow. Antennæ with segments i. and ii. pale brown; iii. to v. and base of vi. dark brown; flagellum white to creamy white or very pale brown; segment iii. longer than iv., with 18 to 26 sensoria over its whole length; iv. and v. equal, the former with 18 to 20 sensoria over its whole length; the pale flagellum longer than iv. + v.; v. with

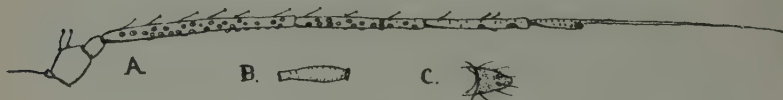


Fig. 29.—*Rhopalosiphum alboapicalis* Theobald.  
A. Antenna; B. Cornicles; C. Cauda of alate ♀.

1 to 3 sensoria + the primary one. Legs pale yellowish, with black apices to the tibiæ and black tarsi. Rostrum yellow, dark at apex, not reaching second coxæ. Wings with yellowish insertions and brown veins.

*Length* 1.8 to 2 mm.

*FOOD PLANT.* *Malva* spp.

*LOCALITY.*—Wye, 7 vi. 13.

*Observations.*—Described from several alate females, easily distinguished by the pale flagellum. A few small green larvæ

surrounded some of the females. It bears some resemblance to Koch's *Rhopalosiphum staphyleæ*, but can be distinguished by having, in addition to the white apices of the antennæ, 4 not 5, lateral abdominal spots and no dark apices to the femora.

*RHOPALOSIPHUM RUMICIS* Theobald.

Ent. Mo. Mag., LXI., 76 (1925).

*Alate viviparous female.* Head and thorax black. Abdomen dark, but paler than thorax. Antennæ, cauda and anal plate dark. Cornicles dark, paler at base. Legs green, apices of tibiæ broadly darkened; tarsi dark. Stigma deep greyish-brown; veins brown. Antennæ shorter than body; segment i. wider than ii., no longer; iii. very long, longer than vi. with 67 to

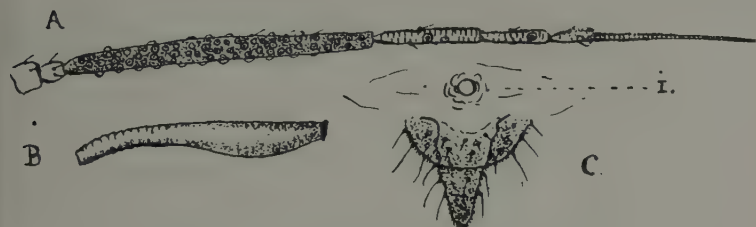


Fig. 30.—*Rhopalosiphum rumicis* Theobald.

A. Antenna of alate female; B. Cornicle; C. Cauda and gland-like process, i.

70 sensoria, densely packed over its surface and projecting on each side; iv. short, a little longer than v. with 1 large round and 1 small round sensoria near middle; vi. with basal area thick, rather more than half of v.; flagellum long but much shorter than iii. Several short hairs on i., ii. and iii.; 2 in middle of iv.; some times 2 near middle of v. Cornicles rather long, a little longer than iv. + v. of antennæ, basal half narrow, apical half swollen, becoming narrowed towards apex, basal area crenulate; apical with fine dotted imbrications. Cauda about half cornicles, bluntly acuminate, 3 hairs each side and 1 in middle of apical half. Anal plate rounded. A few hairs on apex of body. Rostrum with apex dark, last segment long, reaching to second coxæ. Legs with a few hairs on femora and many rather stiff spine like ones

on tibiæ. Wings large, costal border stained. A peculiar gland-like body near apex of abdomen.

*Length* 2.9 to 3 mm.

FOOD PLANT. *Rumex* sp.

LOCALITY. Porlock, Somerset, 14. vi. 15 (W. C. Crawley).

*Observations.* Described from specimen taken by Mr. Crawley with a note on the slide "Black." The abdomen is much paler in the mounted specimen than the head and thorax. Cornicles and antennæ very marked; segment iii. of the antennæ having a very tuberculate appearance and there is a curious round gland-like structure mediad of the abdomen near the apex.

# RHOPALOSIPHUM PRUNIFOLIÆ Fitch.

*Aphis prunifoliæ* Fitch.

*Siphocoryne avenæ* Pergande.

*Aphis annuæ* Oestlund.

*Rhopalosiphum prunifoliæ* Baker and Turner.

*Rhopalosiphum avenæ* Takahashi.

*Aphis fitchii* Sanderson, etc.

*Toxoptera rufiabdominalis* Sasaki.

*Yamataphis rufiabdominalis* Matsumura.

*Yamataphis oryzae* Matsumura.

*Yamataphis papaveris* Takahashi.

*Rhopalosiphum papaveris* Takahashi.

Fitch, First Rep. Nox and Ben. Ins., N.Y., 122 (1855); Oestlund, Aphid. Minn., 43 (1886); Kaltenbach, Mono. Pflanz., 74 (1843); Sanderson, Bull., 74, Del. Coll. Agri. Exp. Sta., 137-149 (1906); Theobald, Rep. Eco. Zool., 1905, 30-32, figs. 10, 11, 14, 15 (1906); Theobald, Insect Pests Fruit, 137, figs. III-III4 (1908); Theobald, Canad. Ent., XLVIII., 235-242 (1916); Baker, Science, N.S. xlv., 410 (1917); Quaintance and Baker, U.S.A. Dep. Agri. Farmer's Bull., 804, 13 (1917); Patch, Maine Agri. Exp. Sta. Bull., 202, 172 (1912); Matsumura, Journ. Coll. Agri. Tohoku Imp. Univ., VII., 6, 359 (1917); 343 (1917); 6, 413 (1917); Sasaki, 202 (1899); Essig and Kuwana Proc. California Acad. Sci., Ser. 4, VIII., 3, 67 (1918); Mathison, Agri. Exp. Sta. Cornell Univ., N.Y. Mem., 24,



683-762 (1919) ; Swain, Univ. Cal. Pub., III., 1, 94 (1919) ; Baker and Turner, Journ. Agri. Res., XVIII., 6, 311 (1919) ; Peterson, New Jersey Agri. Exp. Sta. Bull., 332, 5 (1919) ; Lathrop, Journ. Eco. Ent., XIV., 436 (1921) ; Mordwilko, Les Pucerons des Graminées, I., 52 (1921) ; Takahashi, Agri. Exp. Sta. Gov. Formosa, Sp. Rep. No. 20, 43 (1921) ; 20, 39 (1921) ; idem, 34 (1921) ; Takahashi, Dep. Agri. Gov. Res. Inst. Formosa Rep. 4, 34 (1925) ; idem, Rept. 16, 57 (1925) ; Hokkaido, Agri. Exp. Sta., Rep. 17, 3 (1926) ; Glendenning, Proc. Ent. Soc. Brit. Columbia, No. 21, 41 (1924).

*Alate viviparous female.* (On Apple, Pear, etc.) Head deep olive to brownish-green, pronotum green, with dark central area ; thoracic plates deep olive brown to almost black ; abdomen shiny green, often with a deeper green stripe in the middle and 4 black spots on each side ; some are yellowish-green and darkened basally ; cornicles dusky-grey to deep or very deep brown, rather short, more or less vasiform ; cauda green, rather short ; some show dark transverse bars on posterior of abdomen ; second cubital cell very small as in *padi* ; legs same colour as body, femora may be darkened ; apices of tibiæ and tarsi dark. Segment i. larger than ii. ; iii. larger than iv., not so long as vi., with 17-25 sensoria ; iv. and v. nearly equal ; iv. with 7-14 ; v. 0 to 4 + 1 ; basal area of vi. shorter than v., flagellum four times base. Cornicles narrow, irregular, slightly vasiform. Cauda half to less cornicles.

*Length* 1.4 mm.

*Apterous viviparous female.* Yellowish-green, with an irregular grass-green stripe along dorsum and each side, the median stripe broken into a line of spots. Antennæ and legs same colour as body, apices of cornicles dusky and apices of tibiæ and the tarsi ; cauda pale, short.

Some show deeper green or rusty areas at base of cornicles. Cornicles pale, apices dusky, and constricted, slightly vasiform, antennæ of 6 segments ; i. larger than ii. ; iii. longer than iv. and not quite so long as vi. ; iv. and v. nearly equal ; vi. with basal area more than half of v.

*Length* 1.5 to 2 mm.

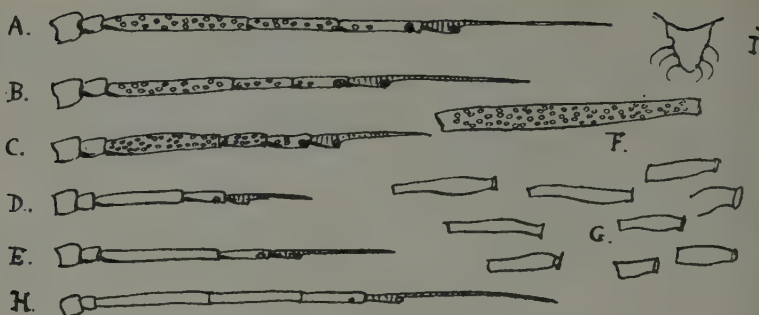


Fig. 31.—*Rhopalosiphum prunifoliae* Fitch.

A. alate ♀ antenna (1st migrant); B. Return migrant; C. Male antenna; D. of Oviparous ♀; E. of Stem Mother; F. Hind tibia of oviparous ♀; G. Cornicles; H. Antenna of apterous ♀; I. Cauda.

*Stem Mother.* Yellowish-green with deeper green transverse lines in the middle forming a median broken meso-dorsal line, darkened laterally; antennæ and legs same colour as body, apices of antennæ, tibiæ and all the tarsi dark; cornicles pale green; apices dusky; in some there are deeper spots at base of cornicles. Antennæ of 5 segments; iii. longest. Cornicles short, flared at apices, swollen in middle. A papilla each side of pronotum.

Length 1.6 mm.

*Return migrant female.* Very similar to the alate migrant from the apple, but the abdomen is a more variable green, yellowish or pale brown and segment iii. of the antennæ has from 12-18 sensoria; iv. 5 to 6; v. 0 to 4.

The *larvæ* are yellowish-green, with two dark spots on the head; legs brownish to greenish-white, cornicles deep brown or all green.

The *pupæ* are pale yellowish-green, with dusky tips to the wing cases.



Fig. 32.

Oviparous females of A.B. *Aphis avenae* Fab.; C. and D. *Rhopalosiphum prunifoliae* Fitch; A. and C. Antennæ; B. and D. Hind tibiæ.

*Male.* Alate. Head and thorax dark ; abdomen yellowish-brown to deep umber-brown, with dark lateral spots and some show deeper coloured median bars ; antennæ deep brown ; cornicles brownish ; cauda dark. Antennal segment iii. not as long as vi., with 28-33 sensoria over whole length ; iv. longer than v. with 14-18 sensoria ; v. with 4-12 sensoria ; base of vi. small, irregular in form ; flagellum rather long. Cauda irregular in outline, a little longer than segment iv. of antennæ. Claspers dark. Penis pale.

*Length* 1.2 to 1.5 mm.

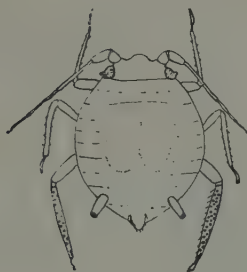


Fig. 33.—*Rhopalosiphum prunifoliae* Fitch.  
Oviparous ♀.

*Oviparous female.* Apterous. Yellowish-green to dull green and to almost brown ; legs deep green and antennæ greenish, apices of antennæ dark also of tibiae and the tarsi ; cornicles green, apices dark. Antennæ of 6 segments, short. Hind tibiae slightly enlarged, with 58-65 sensoria over nearly the whole length.

*Length* 1 to 1.2 mm.

**FOOD PLANTS.** Apple ; Pear ; Hawthorn ; and cereals and various grasses. Several other food plants in Japan.

**LOCALITIES.** Generally spread over the fruit growing areas of Kent, Sussex, Worcestershire, Herefordshire, Cambridgeshire and Norfolk. Also in Essex, Suffolk, Hertfordshire, Buckinghamshire, Berkshire, Surrey, Middlesex. Windermere, 10 x. 15 (Rymer Roberts) ; Great Salkeld, Cumberland, 24 ix. 14 (Britten) ;

Bangor, v. 23 ; Aberystwyth, 20 iv. 14 and 20 v. 23 ; Ruthin, 3 v. 22 ; Chirk, North Wales, 24 v. 22 ; Anglesey, 11 x. 21 and 2 v. 24 (Walton) ; Stirkoke, Wick, 10 vi. 22 (D. Jackson) ; Port Seton, East Lothian, 7 vi. 22 (Evans) ; Borroscome, Co. Tipperary, Ireland, 16 x. 25 (Stelfox). British Columbia (Glendenning). America and Japan.

*Observations.* This is one of the Common Plant Lice found on the Apple and Pear and also on Hawthorn, and is sometimes troublesome, but not to the same extent as *Anuraphis roseus* or *Aphis pomi*.

It occurs in the egg stage during the winter and early spring on the Apple, Pear and Hawthorn, rarely on the Quince. The ova hatch in the early part of April. The small green larvæ soon become the mature "Stem Mothers," which produce living young



Fig. 34.—*Rhopalosiphum prunifoliae* Fitch.  
A colony of Apterous ♀♀ on Apple.

and the colonies continue to increase throughout May. During the latter month some assume the pupal stage and alate viviparous females occur. At Wye I have usually found they assume wings about the end of May, but in 1914 many were seen as early as the 10th. These winged females continue until mid June, then they fly away and those that settle on grasses and corn produce living young and the progeny of these continue to breed on the *Graminaceæ* until the autumn. Usually about mid October alatae appear on the *Graminaceæ* and these females fly back to the Apple, Pear and Hawthorn and produce young which become the oviparous females. Later alate males arise on the late corn and grasses and fly away and join the oviparous females and fertilise them. Some males seem also to be formed on the Apples. There sexuales occur in October and may be found as late as mid November. On the Apple it does not cause much leaf curling, as it lives very largely in the blossom trusses and up the strigs and over the blossoms. It may often be found mixed up with the Apple Sucker (*Psylla mali*). It has been confused with *Aphis avenæ* but can be demarked by the irregular, often semi-clavate cornicles and in the males by the shorter and thicker antennæ, which have a more irregular appearance and fewer sensoria; the hind tibiæ of the oviparous female also differ. Fitch described it as *Aphis prunifoliæ* and Sanderson later renamed it *Aphis fitchii*. Other names by which it has been known are given as synonyms.

#### RHOPALOSIPHUM FÆNICULI Passerini.

*Siphocoryne fæniculi* Passerini.

*Hyadaphis fæniculi* Schouteden.

Passerini, Gli Afidi, 52 (1860); Buckton, Mono. Brit. Aphid, II., 26, 27, pl. XLV., figs. 4 to 6 (1877); Macchiati, p. 259 (1883); Schouteden, Mem. Soc. Ent. Belg., XII., 229, 2 (1906); Del Guercio, Redia, VII. (1911), p. 330.

*Apterous viviparous female.* Ovate. Wholly green, much punctured. Head narrow. Thoracic segments and abdomen marked by sutures. Antennæ short, also the legs. Eyes brown. Cornicles green and slightly curved. Tail rather large. Younger specimens are luteous in colour and very broad above the nectaries. Size of body  $2.02 \times 1.01$  mm.

*Alate viviparous female.* Small. Head broad, black. Vertex convex. Eyes red. Antennæ black. Third joint tuberculate. Thorax black and dull. Abdomen flat, broad and green. Cornicles curved and moderately dilated. Tail green. Legs short and green, with olive femora and tibial points. Wings broad and rounded at the tips. Insertions and cubitus greenish. Stigma grey. Rostrum reaches to second coxæ. Size of body  $1.27 \times 0.58$  mm; expanse of wings 4.81 mm.

FOOD PLANT. *Fœniculum vulgare*; *Pastinaca sativa* (Macchiati).

LOCALITIES. Haslemere and Wanstead in May and June (Buckton).

*Observations.* This cannot be the common Fennel species I have found as it has no supra-caudal process as seen in *Cavariella ægopodii* Scop. Buckton says: "It may be distinguished from *S. capreæ* by its diminutive size and the absence of the little horn above the tail." Moreover Del Guercio retains it in the genus *Siphocoryne* and did not place it in his genus *Cavariella*. Passerini remarks that the alate female is sometimes rusty between the cornicles. The insect I have recorded from Kent as this species is not so, but *C. ægopodii*. Schouteden in error refers to Buckton's plate as XLII., which contains figures of *Rhopalosiphum dianthi* and *Siphocoryne pastinacæ*.

Genus APHIS Linnæus.

*Loxerates* Rafinesque.

*Cladoxus* Rafinesque.

*Uraphis* Del Guercio.

*Microsiphon* Del Guercio.

*Stenaphis* Del Guercio.

*Longuiunguis* Van der Goot.

*Melanaphis* Van der Goot.

*Abura* Matsumura.

*Arimakia* Matsumura.

Linnæus, Syst. Nat. Ed., 10, 451 (1758); Rafinesque, Ann. Mo. Mag. and Crit. Rev., I., 361 (1817); Del Guercio, Redia, IV., 192 (1907); Van der Goot, Tijds. v. Ent., 56, 96 (1913); Del



Guercio, Redia, IX., 185 (1913); Van der Goot, Zur. Kenntniss. d. Blattläuse Javas, 89 (1916); Matsumura, Journ. Coll. Agri. Tohoku Univ., 7, pt. 6, 405 and 407 (1917); Baker, Bull, 826, U.S. Dept. Agri., 43, pl. VI., G. to I. (1920).

*Characters of genus.* Head without any prominent frontal tubercles. Antennæ of 6 segments; sensoria round. Cornicles cylindrical to slightly tapering. Cauda usually not so long as cornicles, rather elongate or sub-conical; in most constricted near the middle. Wings usually normal. Males alate. Oviparous females apterous.

Exactly which *Aphis* is the type of the genus *Aphis* of Linnæus seems a matter of doubt. The Black Elder *Aphis* (*Aphis sambuci* Linn.) is taken to be the type. In 1801 Lamarck made *Aphis ulmi* the type. As Linnæus included all manner of Aphides in his genus and set no special type, *ulmi* is really the type of *Aphis*. There is little doubt in my mind that the *ulmi* of Linnæus is the *Eriosoma lanuginosum* of Hartig and hence the generic name *Aphis* should apply to what we now call *Eriosoma*. The alteration is really one of expediency. To change and make *Aphis* a synonym of *Eriosoma* would lead to too great a confusion, and the matter has been referred to the International Committee on Zoological Nomenclature to make *Aphis* a *genus conservandum* purely on this ground. Many genera, following Baker, have been sunk as they also seem to me to be based on such fragile characters that they become more specific, than generic.

#### BRITISH SPECIES OF *Aphis*.

*Aphis sambuci* Linnæus.

- „ *laburni* Kaltenbach.
- „ *hederæ* Kaltenbach.
- „ *pomi* De Geer.
- „ *plantaginis* Schrank.
- „ *grossulariæ* Kaltenbach.
- „ *rumicis* Linnæus.
- „ *saliceti* Kaltenbach.
- „ *idæi* Van der Goot.
- „ *callunæ* Theobald.
- „ *alienus* Theobald.
- „ *urticaria* Kaltenbach.

- Aphis scabiosæ* Schrank.  
 „ *parietaria* Theobald.  
 „ *gossypii* Glover.  
 „ *neopolygoni* nov. nom.  
 „ *tripolii* Laing.  
 „ *acetosella* Theobald.  
 „ *apii* Theobald.  
 „ *sambucaria* Passerini.  
 „ *avenæ* Fabricius.  
 „ *cratægella* Theobald.  
 „ *ochropus* Koch.  
 „ *jacobææ* Schrank.  
 „ *sedii* Kaltenbach.  
 „ *sanguisorbæ* Schrank.  
 „ *solanina* Passerini.  
 „ *epilobii* Kaltenbach.  
 „ *symphiti* Schrank.  
 „ *wilsoni* Laing.  
 „ *dallmani* Theobald.  
 „ *compositellæ* Theobald.  
 „ *triglochinis* Theobald.  
 „ *pseudohederæ* sp. nov.  
 „ *githaginella* sp. nov.  
 „ *neoreticulata* Theobald.  
 „ *oxalina* Theobald.  
 „ *viburni* Scopoli.  
 „ *newtonii* Theobald.  
 „ *ilicis* Kaltenbach.  
 „ *loti* Kaltenbach.  
 „ *nasturtii* Kaltenbach.  
 „ *lantanæ* Koch.  
 „ *lantanælla* Theobald.  
 „ *epilobiaria* sp. nov.  
 „ *frangulæ* Kaltenbach.  
 „ *rhamni* Boyer.  
 „ *beccabungæ* Koch.  
 „ *præterita* Walker.  
 „ *diphaga* Walker.  
 „ *tincta* Walker.  
 „ *epilobiina* Walker.

*Aphis tormentillæ* Passerini.

- „ *genistæ* Scopoli.
- „ *erysimi* Kaltenbach.
- „ *pedicularis* Buckton.
- „ *edentula* Buckton.
- „ *acetosæ* Buckton.
- „ *instabilis* Buckton.
- „ *rufula* Walker.
- „ *brevisiphona* Theobald.
- „ *infuscata* Koch.

Species described by Walker, not identified :—

*Aphis pollinosa* Walker.

- „ *despecta* Walker.
- „ *triphaga* Walker.
- „ *euphorbiæ* Walker.
- „ *conspersa* Walker.
- „ *confusa* Walker.
- „ *introducta* Walker.
- „ *robusta* Walker.
- „ *tenuior* Walker.
- „ *inculta* Walker.

Linnæus' *Aphis padi* is not listed here. His name *padi* refers to Reaumur's figures only and they are *arundinis* and *helichrysi*. Linnæus never described *padi*, and if his name is used, it must apply to *helichrysi*. —*Vide* note in Appendix.

FOOD PLANTS OF *Aphis*.

<i>Achillea millefolium</i>	<i>A. plantaginis</i> Schrank.
„ <i>ptarmica</i>	<i>A. plantaginis</i> Schrank.
<i>Acalypha virginica</i>	<i>A. gossypii</i> Glover.
<i>Agrimonia eupatoria</i>	<i>A. dallmani</i> Theobald.
<i>Ailanthus glandulosa</i>	<i>A. pomi</i> De Geer.
<i>Allium cepa</i>	<i>A. rumicis</i> Linnæus.
<i>Anagallis arvensis</i>	<i>A. rumicis</i> Linnæus.
<i>Apium graveolens</i>	<i>A. apii</i> Theobald.
„ „	<i>A. avenæ</i> Fabricius.
„ „	<i>A. inculta</i> Walker.
<i>Aralia</i> sp.	<i>A. hederæ</i> Kaltenbach.
<i>Artemisia maritima</i>	<i>A. rumicis</i> Linnæus.
„ <i>ulgaris</i>	<i>A. rumicis</i> Linnæus.

<i>Arctium lappa</i>	<i>A. rumicis</i> Linnæus.
<i>Asparagus</i>	<i>A. rumicis</i> Linnæus.
<i>Aster tripolii</i>	<i>A. tripolii</i> Laing.
<i>Avena sativa</i>	<i>A. avenæ</i> Fabricius.
<i>Beta maritima</i> etc.	<i>A. rumicis</i> Linn.
<i>Begonia</i> sp.	<i>A. gossypii</i> Glover.
<i>Bellis perennis</i>	<i>A. plantaginis</i> Schrank.
<i>Calluna vulgaris</i>	<i>A. callunæ</i> Theob.
<i>Carduus</i> spp.	<i>A. rumicis</i> Linn.
<i>Capsella bursa-pastoris</i>	<i>A. erysimi</i> Kalt.
„ „	<i>A. gossypii</i> Glover.
<i>Chenopodium album</i>	<i>A. gossypii</i> Glover.
„ <i>polyspermum</i>	<i>A. ochropus</i> Koch.
„ spp.	<i>A. rumicis</i> Linn.
„ „	<i>A. brevisiphona</i> Theob.
<i>Chrysanthemum</i>	<i>A. plantaginis</i> Schrank.
<i>Corydalis lutea</i>	<i>A. rumicis</i> Linn.
<i>Cotoneaster vulgaris</i>	<i>A. pomi</i> De Geer.
<i>Convolvulus</i> spp.	<i>A. gossypii</i> Glover.
<i>Cornus mas</i>	<i>A. gossypii</i> Glover.
<i>Cosmia</i> sp.	<i>A. gossypii</i> Glover.
<i>Conium album</i>	<i>A. rumicis</i> Linn.
„ <i>maculatum</i>	<i>A. rumicis</i> Linn.
<i>Cratægus oxyacantha</i>	<i>A. cratægella</i> Theob.
„ „	<i>A. pomi</i> De Geer.
„ „	<i>A. avenæ</i> Fab.
„ „	<i>A. edentulæ</i> Buck.
<i>Cydonia</i> sp.	<i>A. pomi</i> De Geer.
<i>Cynara cynobatella</i>	<i>A. neoreticulata</i> Theob.
<i>Cytisus laburnum</i>	<i>A. laburni</i> Kalt.
<i>Cucurbitaceæ</i>	<i>A. gossypii</i> Glover.
<i>Datura stramonium</i>	<i>A. gossypii</i> Glover.
<i>Daucus carota</i>	<i>A. plantaginis</i> Schrank.
<i>Deutzia scabra</i>	<i>A. laburni</i> Kalt.
<i>Dianthus</i>	<i>A. wilsoni</i> Laing.
<i>Digitalis purpurea</i>	<i>A. rumicis</i> Linn.
<i>Diodiateres</i> sp.	<i>A. gossypii</i> Glover.
<i>Dipsacus sylvestris</i>	<i>A. ochropus</i> Koch.
„ „	<i>A. rumicis</i> Linn.
<i>Epilobium</i> spp.	<i>A. despecta</i> Wlk.

<i>Epilobium</i> spp.	A. diphaga Wlk.
„ „	A. epilobii Kalt.
„ „	A. epilobiina Wlk.
„ „	A. epilobiaria Theo.
„ „	A. penicillata Buck.
„ „	A. præterita Wlk.
„ „	A. pollinosa Wlk.
„ „	A. instabilis Buck.
„ „	A. tincta Wlk.
„ „	A. triphaga Wlk.
<i>Erysimum officinale</i>	A. erysimi Kalt.
<i>Euonymus europæus</i>	A. rumicis Linn.
„ <i>japonicus</i>	A. rumicis Linn.
<i>Euphorbia peplis</i>	A. euphorbiæ Wlk.
<i>Fumaria muralis</i>	A. laburni Kalt.
„ <i>officinalis</i>	A. rumicis Linn.
<i>Galium</i> spp.	A. rumicis Linn.
<i>Genista anglica</i>	A. genistæ Scopoli.
„ <i>tinctoria</i>	A. genistæ Scopoli.
<i>Glaucium luteum</i>	A. rumicis Linn.
<i>Graminaceæ</i>	A. alienus Theob.
<i>Hedera helix</i>	A. hederæ Kalt.
„ „	A. pseudohederæ sp. nov.
„ „	A. rumicis Linn.
<i>Heracleum spondylium</i>	A. rumicis Linn.
<i>Hibiscus</i> spp.	A. gossypii Glover.
„ <i>syriacus</i>	A. laburni Kalt.
<i>Hordeum</i>	A. avenæ Fab.
<i>Humulus lupulus</i>	A. rumicis Linn.
„ „	A. gossypii Glover.
<i>Hydrangea</i>	A. gossypii Glover.
<i>Ilex europæus</i>	A. ilicis Kalt.
<i>Iris pseudacorus</i>	A. newtonii Theob.
<i>Lamium purpureum</i>	A. alienus Theob.
<i>Lappa major</i>	A. gossypii Glover.
<i>Larix communis</i>	A. tenuior Wlk.
<i>Lathyrus</i> sp.	A. rumicis Linn.
„ „	A. laburni Kalt.
<i>Leontodon taraxacum</i>	A. plantaginis Schrk.
<i>Lepidium virginicum</i>	A. gossypii Glover.

<i>Lepidium draba</i>	<i>A. rumicis</i> Linn.
<i>Lotus corniculatus</i>	<i>A. loti</i> Kalt.
<i>Lychnis diurna</i>	<i>A. plantaginis</i> Schrk.
„ <i>githago</i>	<i>A. githaginella</i> sp. nov.
<i>Lycospermum</i>	<i>A. gossypii</i> Glover.
<i>Lycopsis officinalis</i>	<i>A. rumicis</i> Linn.
<i>Matricaria chamomillæ</i>	<i>A. rumicis</i> Linn.
<i>Matricaria</i> sp.	<i>A. rumicis</i> Linn.
<i>Malva rotundifolia</i>	<i>A. gossypii</i> Glover.
„ <i>sylvestris</i>	<i>A. rumicis</i> Linn.
<i>Mecanopsis japonicus</i>	<i>A. rumicis</i> Linn.
<i>Medicago</i> sp.	<i>A. laburni</i> Kalt.
<i>Mentha</i> sp.	<i>A. rumicis</i> Linn.
<i>Mespilus japonicus</i>	<i>A. pomi</i> De Geer.
„ „	<i>A. avenæ</i> Fab.
<i>Nasturtium amphibium</i>	<i>A. nasturtii</i> Kalt.
„ <i>officinale</i>	<i>A. nasturtii</i> Kalt.
„ <i>palustris</i>	<i>A. nasturtii</i> Kalt.
„ sp.	<i>A. rumicis</i> Linn.
<i>Nepeta glechoma</i>	<i>A. gossypii</i> Glover.
<i>Nicotiana rustica</i>	<i>A. scabiosæ</i> Schrk.
<i>Pastinaca sativa</i>	<i>A. robusta</i> Wlk.
<i>Parietaria officinalis</i>	<i>A. parietaria</i> Theob.
<i>Papaver</i> spp.	<i>A. rumicis</i> Linn.
„ „	<i>A. acetosella</i> Theob.
<i>Pedicularis palustris</i>	<i>A. pedicularis</i> Buck.
<i>Periploca græsa</i>	<i>A. nasturtii</i> Kalt.
<i>Phaseolus nanus</i>	<i>A. gossypii</i> Glover.
<i>Plantago</i> spp.	<i>A. plantaginis</i> Schrk.
„ „	<i>A. rumicis</i> Linn.
<i>Polygonum fagopyrum</i>	<i>A. neopolygoni</i> nov. nom.
„ <i>nodosum</i>	<i>A. neopolygoni</i> nov. nom.
„ sp.	<i>A. rumicis</i> Linn.
<i>Portulaca oleracea</i>	<i>A. gossypii</i> Glover.
„ „	<i>A. rumicis</i> Linn.
<i>Potentilla palustris</i>	<i>A. tormentillæ</i> Pass.
<i>Pimpinella magna</i>	<i>A. rumicis</i> Linn.
<i>Prunus cerasus</i>	<i>A. avenæ</i> Fab.
„ <i>padus</i>	<i>A. avenæ</i> Fab. and <i>A. infuscata</i> .
„ <i>spinus</i>	<i>A. infuscata</i> Koch.



<i>Prunus insititia</i>	A. infuscata Koch.
<i>Pyrethrum inodorum</i>	A. instabilis Buck.
<i>Pyrus communis</i>	A. pomi De Geer.
„ „	A. avenæ Fab.
„ „	A. rumicis Linn.
„ <i>malus</i>	A. pomi De Geer.
„ „	A. avenæ Fab.
„ „	A. rumicis Linn.
„ <i>pyrastri</i>	A. pomi De Geer.
<i>Radicula nasturtium-aquaticum</i>	A. nasturtii Kalt.
<i>Raphanus raphanistrum</i>	A. erysimi Kalt.
<i>Reseda odorata</i>	A. introducta Wlk.
„ „	A. rumicis Linn.
<i>Rhamnus catharticus</i>	A. rhamni Boyer.
„ „	A. frangulæ Kalt.
„ <i>frangulæ</i>	A. rhamni Boyer.
„ „	A. frangulæ Kalt.
„ <i>alpina</i>	A. rhamni Boyer.
<i>Ribes nigrum</i>	A. grossulariæ Kalt.
„ <i>rubrum</i>	A. grossulariæ Kalt.
„ <i>sanguineum</i>	A. grossulariæ Kalt.
<i>Rosa spp.</i>	A. idæi V. d. Goot.
<i>Rubus idæus</i>	A. idæi V. d. Goot.
„ „	A. rumicis Linn.
„ <i>fruticosus</i>	A. idæi V. d. Goot.
„ <i>sp.</i>	A. idæi V. d. Goot.
„ „	A. idæi V. d. Goot.
<i>Rumex sp.</i>	A. acetosæ Buck.
„ „	A. acetosella Theob.
„ „	A. gossypii Glover.
„ „	A. ochropus Koch.
„ „	A. wilsoni Laing.
„ „	A. plantaginis Schrk.
„ „	A. rumicis Linn.
<i>Sambucus nigra</i>	A. sambuci Linn.
„ „	A. sambucaria Pass.
<i>Salix capreæ</i>	A. saliceti Kalt.
„ <i>viminialis</i>	A. saliceti Kalt.
„ <i>sp?</i>	A. infuscata Koch.
<i>Salsola kali</i>	A. rufula Wlk.

<i>Sanguisorba officinalis</i>	A. sanguisorbæ Schrk.
„ „	A. laburni Kalt.
<i>Scabiosa arvensis</i>	A. scabiosæ Schrk.
„ „	A. confusa Wlk.
„ „	A. conspersa Wlk.
<i>Sedum album etc.</i>	A. sedi Kalt.
<i>Senecio jacobæa</i>	A. rumicis Linn.
„ „	A. jacobææ Schrk.
<i>Solanum dulcamara</i>	A. rumicis Linn.
„ <i>officinale</i>	A. rumicis Linn.
„ <i>tuberosum</i>	A. gossypii Glover.
„ „	A. solanina Pass.
„ „	A. rumicis Linn.
<i>Sonchus sp.</i>	A. compositellæ Theob.
<i>Sorbus aucuparius</i>	A. pomi De Geer.
„ <i>domesticus</i>	A. pomi De Geer.
„ <i>torminalis</i>	A. pomi De Geer.
„ „	A. avenæ Fab.
<i>Spartium junceum</i>	A. laburni Kalt.
„ <i>scoparium</i>	A. laburni Kalt.
<i>Spinacia oleracea</i>	A. gossypii Glover.
<i>Stellaria aquatica</i>	A. nasturtii Kalt.
„ <i>media</i>	A. gossypii Glover.
<i>Symphitum officinale</i>	A. symphiti Kalt.
<i>Sisymbrium officinale</i>	A. nasturtii Kalt.
<i>Taraxacum dens-leonis</i>	A. gossypii Glover.
<i>Trifolium pratense</i>	A. gossypii Glover.
<i>Triglochin maritimum</i>	A. triglochinis Theo.
<i>Tussilago sp.</i>	A. alienus Theob.
<i>Ulex europæus</i>	A. rumicis Linn.
<i>Urtica dioica</i>	A. urticaria Kalt.
„ <i>urens</i>	A. urticaria Kalt.
<i>Veronica beccabunga</i>	A. beccabungæ Koch.
<i>Viburnum lantana</i>	A. lantanæ Koch.
„ „	A. lantanælla Theob.
„ „	A. rumicis Linn.
„ <i>opulus</i>	A. grossulariæ Kalt.
„ „	A. lantanæ Koch.
„ „	A. lantanælla Theob.
„ „	A. viburni Scop.

<i>Vicia</i> spp.	<i>A. rumicis</i> Linn.
" "	<i>A. laburni</i> Kalt.
<i>Viola</i> sp.	<i>A. plantaginis</i> Schrk.
<i>Zelkora acuminata</i>	<i>A. laburni</i> Kalt.

# KEY TO BRITISH SPECIES OF *Aphis*.

## *Alate viviparous females.*

- A. Cornicles cylindrical ; imbricate.
- B. Dark species ; abdomen black, deep brown or very deep green, with darker bars and lateral spots.

## i. Cornicles long.

- a. Cornicles and cauda black. Abdomen black to blackish-green, shiny ; cornicles long and thin ; iii. with 30-36 ; iv. 0-1 ; v. 0 ; cauda one-quarter to one-fifth cornicles.

*sambuci.*

Abdomen blackish-brown to deep olive-green ; black lateral spots and broad cross bars ; iii. 11-20 ; iv. 1-5 ; v. 0-2 + 1. Cornicles moderate. Antennal hairs short.

*rumicis.*

Very similar in appearance but cornicles and cauda nearly equal.

*brevisiphona.*

Antennal hairs long ; abdominal cross-bars narrow ; iii. 25-28 ; iv. 4-6. Cauda thick ; two-thirds cornicles ; lateral papillæ blunt.

*ilicis.*

Abdomen dull brown ; iii. 17-20 ; iv. 8-12 ; v. 0-6 + 1. Cauda rather small, hairs few, 3-4 + 1 ; two-thirds of cornicles.

*hederæ.*

Abdomen black to dull greenish-black ; iii. 12-14 ; iv. 6-8 ; v. 0-3 + 1 ; cauda many long hairs.

*epilobii.*

Abdomen blackish-green ; iii. 16-20 ; iv. 0-3 ; caudal hairs 4 and 4 ; cauda half cornicles ; cornicles rather long.

*jacobææ.*

Abdomen deep greenish-brown, dark transverse bars and lateral spots or a large dark dorsal patch ; iii. 20-28 ; iv. 5-7 ; v. 0 + 1. Cornicles narrow, cylindrical. Cauda hairy. Antennæ very hairy.

*lantanae.*

Cornicles thick. Antennæ not hairy ; iii. 30-32 ; iv. 8-12 ; vi. 0-6 + 1 ; caudal hairs 2 and 2.

*lantanaella.*

Deep shiny brown ; iii. with 26-32, very small sensoria ; iv. with 9-14.

*infuscata.*

All black to deep shiny black.

*diphaga.*

Antennæ with few sensoria on iii. Whole body shiny black ; cornicles long ; cauda half cornicles ; hairs 4 and 4 ; iii. 3-6 ; iv. 0. *laburni.*

Abdomen very deep green, irregular dark bars and lateral spots ; iii. 5-7 ; iv. 0-1. Cauda equal cornicles, hairs 3 and 4. *oxalina.*

ii. Cornicles short.

Cauda as long as or longer than cornicles.

Black, shiny. *genistæ.*

Abdomen very deep green ; iii. many sensoria ; iv. 0. *sedi.*

BB. Abdomen distinctly green with black markings.

b. Cornicles and cauda black.

Lateral papillæ very prominent. Abdomen green, 3 large and 1 small pairs of black lateral spots ; iii. 7-8 ; iv. 0. Caudal hairs 3 and 4. *plantaginis.*

Abdomen green, 4 pairs black lateral spots, a dark patch base of cornicles ; a dark bar between them and 2 dark bars caudad ; iii. 9-16 ; iv. 3-7 ; lateral papillæ 1 and 6 largest. *newtonii.*

Abdomen green, a deeper green median line and 5 pairs black lateral spots ; cornicles short *rhamni.*

Lateral papillæ not especially large. Abdomen green ; 4 pairs black lateral spots ; iii. 6-10 ; iv. 2-4 ; v. 0 + 1 ; caudal hairs 4 and 5 ; cornicles markedly black. *pomi.*

Abdomen green, shiny ; a dark patch caudad ; black lateral spots ; iii. 7 ; iv. 1-2 ; v. 1 + 1. Caudal hairs 3 and 3, equal three-quarters cornicles. *sympitii.*

Abdomen green, black lateral spots and darker median line ; iii. 9-11 ; iv. 0. *beccabungæ.*

Abdomen greenish ; 4 pairs black lateral spots ; iii. 8-12 ; iv. 2-5 ; v. 0 + 1 ; caudal hairs 3 and 3 ; two-thirds of cornicles. *nasturtii.*

Abdomen green, a row of black spots, each side. Cornicles, one-eighth of body. *epilobiina.*

Abdomen green to yellow-green with black markings ; iii. 26-30 ; iv. 9-12 ; v. 1-3 + 1 ; cauda several hairs, not quite equal to cornicles ; cornicles rather short and thick. *compositellæ.*

bb. Cornicles black ; cauda green. Abdomen yellow to green, 3-4 pairs black lateral spots, 2-3 broken dorsal bands or

spots; iii. 5-8; iv. 0. Cauda several hairs. Cornicles rather long. *gossypii*.

Abdomen green to deep green; lateral dark spots. Cornicles short and rather thick. Caudal hairs 4 and 4; segment iii. 4-6; iv. 0. *parietaria*.

Abdomen dark olive-green with obscure transverse dark bars. *acetosæ*.

Abdomen bright yellow to green with mottling and lines; iii. 5; iv. 0; caudal hairs 3 and 3; cornicles long, curved outwards. *idæi*.

Cauda small.

Abdomen green, with thin dorsal lines; iii. 24-28; iv. 6-8; v. 1 + 1; cornicles dusky; cauda half cornicles.

*sambucaria*.

*bbb*. Cornicles and cauda olive-green, dusky olive-green to deep brown.

Abdomen green to dark green, often 3 deeper coloured bars in front, smaller ones behind, black lateral spots; iii. 9-11; iv. 4; caudal hairs 3 and 3. *præterita*.

Abdomen green and black; cauda and cornicles deep brown; iii. 12-16; iv. 3-6; caudal hairs 2 and 2, three-quarters of cornicles. *frangulæ*.

Abdomen deep olive-green with darker stripes and lateral spots; iii. 13-17; iv. 4; caudal hairs 4 and 4, more than half cornicles. *ochropus*.

Abdomen green, shiny, deep olive-green median line or mottled deep green; iii. 13-18; iv. 2-5; caudal hairs 4 and 4. *acetosella*.

Abdomen green; iii. 9-12; iv. 3; v. 0-1 + 1; caudal hairs 4 and 4. *tripolii*.

Abdomen green, 3 pairs of large black lateral spots; iii. 10-13; iv. 3-6; caudal hairs 3 and 3. *neopolygoni*.

Abdomen green, 3 pairs of dark lateral spots and darker mottlings and bands; (on *Padus*) iii. 18-35; iv. 6-19; v. 0-6; (on Corn) iii. 16-22; iv. 5-9; v. 0-2 + 1. Cornicles from olive-green to dusky. *avenæ*.

Abdomen green, dark lateral spots; iii. 9-14; iv. 2-6; cauda 4 and 5, two-third of cornicles. *solanina*.

Abdomen pale yellow-green, small dark lateral spots and

- darker median patches and stripes ; iii. 13-18 ; iv. 6-10 ; cauda more than half cornicles. *githaginella*.
- bb. Cornicles dark green, paler apices ; cauda dark green. Abdomen dark green ; black lateral papillæ. *penicillata*.
- bbb. Cornicles and cauda pale (yellow or green). Abdomen deep yellow-green to very dark green, often with paler lines ; 6-7 pairs of lateral tubercles ; iii. 8-12 ; iv. 5-7 ; v. 3-4 ; cauda yellowish to light green, a few hairs ; cornicles cylindrical, yellowish. *grossulariæ*.  
Abdomen green with dark and bright green mottlings and dark lateral spots ; iii. 4-8 ; iv. 0 ; caudal hairs 3 and 4. Cornicles yellow ; apices black. *saliceti*.
- BBB. Abdomen green, no black markings.
- g. Cornicles and cauda black.  
iii. 36-45 ; iv. 16-18 ; v. 7-10 + 1 ; caudal hairs 3 and 3, equal two-thirds cornicles. *triglochinis*.
- gg. Cornicles and cauda deep green to brown.  
Abdomen all green or mottled ; iii. 6-8 ; iv. 3-5 ; cauda few hairs, half cornicles ; cornicles moderately long. *urticaria*.  
iii. 5-8 ; iv. 0 ; caudal hairs 4 and 4, more than half cornicles. *scabiosæ*.  
iii. 13-18 ; iv. 0 ; cauda many long hairs, nearly as long as cornicles. *apii*.
- ggg. Cornicles olive-green, long ; cauda green and prominent. *cratægella*.
- BBBB. Abdomen blue-green.  
iii. and iv. many sensoria ; v. 6 + 1 ; cauda one-third cornicles. *wilsoni*.
- AA. Cornicles cylindrical, reticulate at apex. *dallmanii*.
- AAA. Cornicles more or less swollen. Abdomen greenish, blackish lateral spots and broken dorsal bands. Cornicles yellowish, apices darkened ; iii. 15-16 ; iv. 5-6. *erysimi*.
- Apterous viviparous females.*
1. Antennæ without secondary sensoria.
- A. Cornicles cylindrical.
- B. Cornicles long or moderately long.
- C. Head, thorax and body dark.
- a. Cornicles and cauda black.



Dull black, sooty black or with bluish-black tinge. Legs black. Cornicles long, longer than iii. Cauda one-quarter to one-fifth the cornicles. *sambuci.*

Black, with dull bluish meal or shiny; tibiæ mostly pale. Cornicles longer than iii. Cauda half of cornicles.

*laburni.*

Blackish-brown with grey bars each side. *infuscata.*

Black, like *laburni* but cauda nearly equal cornicles.

*oxalina.*

Deep velvety to shiny black, now and then deep olive-green; tibiæ mostly pale and base of femora. Cauda one-fifth of cornicles; hairs curved. Antennal and body hairs short. *rumicis.*

Similar to *rumicis*, but cornicles short. *brevisiphona.*

Dull black to earthy colour; cornicles equal iv.; cauda nearly equal cornicles; legs black and white; body and antennal hairs long. *ilicis.*

Smoky black to very deep brown; legs black and yellowish-white. Cornicles nearly equal iii. Cauda half cornicles, hairs few. *hederæ.*

Dark brown to black. Cornicles slightly expanding before constricted apex; not quite so long as iii. + iv. Cauda third cornicles; hairs 2 and 2 + 1. Antennæ one-quarter length of body, not very hairy. *lantanaella.*

Black to deep green, mealy or shiny. Cornicles equal iii. Cauda two-third cornicles, hairs 3 and 3. *viburni.*

Brown to deep brownish-green inclining to black. Cauda equal v., not quite equal cornicles, hairs 3 and 2.

*sanguisorbæ.*

Black, shiny above, dull below. Cornicles equal iv. Cauda half cornicles; hairs 3 and 3. *loti.*

Black, with mealy purplish tomentum, cuticle with fine hexagonal sculpturing; 5 pairs black lateral spots, due to absence of meal. Cornicles short and thick. Cauda equal cornicles to a little less. *callunæ.*

Dark; head and pronotum very dark; 3 black bars behind cornicles, which equal segment iii. of antennæ; cauda three-quarters cornicles, a few stiff hairs.

*neoreticulata.*

## BB. Cornicles short.

Black, shiny or with bluish-white meal ; cauda as long as cornicles. *genistæ.*

Black above, variegated below ; cauda as long as cornicles and thicker ; small, oval. *tormentillæ.*

*aa.* Cornicles and cauda deep green. Green. *beccabungæ.*

*aaa.* Cornicles dull white to pale yellow. Cauda black or brown.

Dull deep green to black, mealy white. Cornicles equal

*iii.* Cauda not quite so long as cornicles ; hairs 3 and 3 + 2-3 apical. *epilobii.*

## CC. Head and thorax dark, body deep green.

*g.* Cornicles and cauda black.

*d.* Cornicles short.

Blackish-green to deep green. Legs pale except apices of femora and tibiæ and the tarsi. Cauda nearly equal to cornicles ; hairs 2 and 2. *sedi.*

*dd.* Cornicles long.

Blackish-green to dull dark-green, in some paler green bands ; 5 pairs of lateral papillæ ; legs black, base of femora yellow. Cauda few hairs. *jacobææ.*

Deep olive-green to brownish-green, darker transverse bars and lateral spots. Base of cornicles pale. Cornicles equal to *iii.* ; cauda half cornicles. Antennæ hairy. *lantanæ.*

Rich deep green, with dusky tinge or mottled. Legs yellow-green ; 5 pairs lateral tubercles ; a round black spot each side of anal plate. *plantaginis.*

Blackish-green, with 5 deeper coloured lines ; pale leg areas yellow. Cauda equal half cornicles. *rhamni.*

Deep green to rich bright green ; head and band on pronotum darkened, some dark lateral spots, 2 pairs of spots between mid and hind legs, often becoming bars ; lateral papillæ large, especially first and last. *newtonii.*

*gg.* Cauda and cornicles yellow to pale yellow green. Deep bright green to dark green ; 5 pairs lateral papillæ. *grossulariæ.*

## CCC. Head and thorax dark ; body pale or bright green.

*d.* Cornicles moderately long.

e. Cauda and cornicles dark green ; elliptical ; cauda one-half cornicles ; hairs 3 and 3 + 1 ; cornicles not quite equal iii. *epilobiina*.

ee. Cauda and cornicles green or yellow. Cornicles deeper green than body ; cauda deep green. Cornicles half to two-thirds of iii. Cauda two-thirds cornicles, hairs 3 and 3 ; lateral papillæ small. *solanina*.

Yellow-green, green, yellow, mottled green to dark green ; head yellow. Cornicles pale yellow to white, apex dusky, longer than iii. Cauda yellow, half cornicles ; hairs 4 and 5. *urticaria*.

Green, slightly mealy ; 7 pairs dusky lateral spots. Cauda and cornicles green. Cauda prominent, few hairs. *cratægella*.

Yellow-green to dark green, with dark areas ; head and thorax green to reddish-yellow. Cornicles pale green, apices dusky. Cauda yellowish-green not quite equal cornicles (*Rumex* form) ; greenish-yellow ; cornicles pale, apices dusky (*Papaver* form). *acetosella*.

Bright green to yellowish-green or orange, rarely brown. Cornicles yellow, apices brown, long, divergent, much longer than iii. Cauda green to dark-green one-third to one-quarter cornicles, hairs 3 and 4. *saliceti*.

Green to pale yellow-green, 3 darker green median lines. Cornicles pale yellowish-green, apices dusky, longer than iv. Cauda yellow-green, two-third cornicles, hairs 4 and 4. *tincta*.

eee. Cornicles black. Cauda yellow or green. Dull green, with grey-blue meal ; head, thoracic bands and large area on thorax dark, yellow bands on thorax and caudad. Cornicles equal iii. Cauda more than half cornicles, hairs 3 and 3, curved. *symphiti*.

Bright green, mottled deeper green. Cauda green to deep green. Cornicles long, curved outwards, equal to iii. Cauda not quite half cornicles ; hairs 3 and 3. *idæi*.

eeee. Cornicles and cauda black or very dark.

All bright green to yellow-green ; cornicles equal iii. *pomi*.

Green ; cornicles about as long as v. *apii*.

Bright to dusky green or rarely yellow, a few dark or red

- spots. Cornicles rather long, equal iii., black to deep brown; cauda half cornicles, hairs 4 and 4. *scabiosæ*.  
 Bright emerald green. Cauda and cornicles black, nearly equal, cauda darkest at apex. *alienus*.  
 Vivid green, irregular darker green on abdomen. Cornicles dark brown, a little longer than cauda; cauda dark brown, hairs 4 and 4. *tripolii*.  
 Green to deep olive-green. Cornicles a little longer than iii.; cauda half cornicles. *sambucaria*.
- eeee. Cornicles pale; cauda dark green; 4 pairs lateral papillæ. Cornicles longer than iii. Cauda two-third cornicles. *githaginella*.
- eeeeee. Cornicles and cauda green. Cornicles shorter than iii. Cauda two-third cornicles; hairs 3 and 3; legs yellowish-green; cornicles often dusky green. *nasturtii*.
- dd. Cornicles short and thick. Green, pale green, dusky yellow or pinkish. Cauda pale dusky green, nearly equal cornicles; hairs 4 and 4. Cornicles dark. *parietaria*.
- CCCC. Deep blue green. Mealy. Head and part of thorax dark, also base of cornicles. Cauda half cornicles. *wilsoni*.
- CCCCC. Yellow to citron yellow, or yellowish-green. Cornicles black to pallid. Cauda yellow. Small black specks each side of body. Cornicles equal to iii. Cauda half cornicles, several hairs. *dallmani*.  
 Pale yellow to citron yellow, smooth, mottled green and deep green. Cornicles deep green to brown. Legs yellow. Cauda yellow to pale green. Cornicles equal iii.; cauda half cornicles. *diphaga*.  
 Yellow green. Cornicles dusky and legs yellow, apices darker. Cauda brown. Cornicles equal v. (*Padus*). Green, cornicles brown to deep olive green. Cauda dusky, about half cornicles; cornicles longer than iv. (corn). *avenæ*.  
 Yellow, now and then green to almost black; cornicles black, equal to or longer than iii. Cauda green to black, less than half cornicles, hairs 3 and 3, curved. *gossypii*.

## AA. Cornicles slightly swollen.

Green to grey-green. Cornicles yellowish. Cauda deep yellow green, half cornicles; hairs much appressed. Cornicles two-thirds of iii. *erysimi*.

2. Antennæ with secondary sensoria on iii. iv. and v.

*triglochinis*.

## APHIS SAMBUCCI Linnæus.

*Cinara sambuci* Mosley.

*Aphis sambucifolia* Fitch.

*Sambucifex* Amyot.

Linnæus, Syst. Nat., I, II, 734 (1767); Fabricius, Sp. Ins., II., 384, 3 (1781); Ent. Syst., IV., 211, 4 (1794); Schrank, Fn. Boica, II., I, III, 1202 (1801); Kaltenbach, Mono. Pflanz., I., 83, 60 (1843); Walker, Ann. Nat. Hist., V., Se. 2, 27, 76 (1850); Fitch, Cat. Homop. Ins., N.Y., 66 (1855); Walker, List. Homop. (B.M.), IV., 984, 84 (1852); Koch, Die Pflanz., 83, figs. III, 112 (1854); Ferrari, Aphid. Liguriæ, 71, 60 (1872); Sanborn, Kansas Univ. St. Bull., III., 52 (1894); Schouteden, Mem. Soc. Ent. Belg., XII., 227, 56 (1906); Buckton, Mono. Brit. Aphid., II., 99, pl. LXX., figs. 1-4 (1877); Passerini, Aphid. Ital., 32 and 40 (1863); Mosley, Gard. Chron., I., 827 (1860); Amyot, Ann. Soc. Ent. Fr., 2, V., 477, 524 (1872); Kessler, Nova Acta d. Kel. Leop. Carol. Deutchen akd. Nat., XLVII., 3, 135 (1884); Mordwilko, Bio. Centralb., 811 (1907); Matsumura, Coll. Agri. Sapporo, VII., 6, 358 (1917); Swain, Univ. Calif. Bull., III., 123 (1919); Takahashi, Trans. Sapporo, N.H. Soc., VII., 2, 199 (1919); Zool. Mag. Tokyo, XXXII., 197 (1920); Aph. Formosa, 2, 59, 165 (1923).

*Apterous viviparous female.* Large, globose; dull black, with a greenish tinge, often dull sooty black. Abdomen much domed. Antennæ shorter than body; segment i. much broader but no longer than ii.; iii. longer than iv., not quite so long as vi.; iv. a little longer than v.; vi. with basal area rather more than half the length of flagellum, but not nearly so long as v.; iii. to vi. much imbricated and with a few hairs. Rostrum thick, dark, especially apically, between the segments pale. Cornicles black, long, narrow, slightly expanding basally; cylindrical, much longer than antennal segment iii., curved outwards; imbricate.

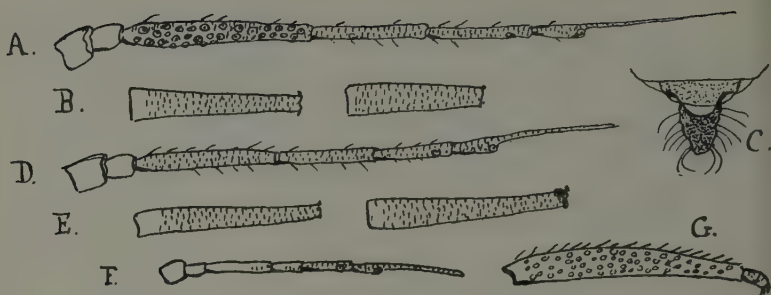


Fig. 35.—*Aphis sambuci* Linnaeus.

A. Antenna ; B. Cornicles ; C. Cauda of alate ♀ ; D. and E. of apterous ♀ ;  
F. Antenna of oviparous ♀ ; G. Hind tibia of oviparous ♀.

Cauda deep black, very spinose, with many fine hairs, about one-quarter length of cornicles and thicker. Anal plate black, spinose, hairy. Legs black, thick, rather short ; tibiae hairy. Abdomen showing two (or more) small lateral papillae.

*Length.* 3.3 to 3.8 mm.

*Alate viviparous female.* Black, shiny ; abdomen blackish to blackish-green. Eyes deep red brown. Abdomen to some extent carinate. Antennae shorter than body, black ; segment iii. paler at base. Rostrum pale, almost white at base ; apex black. Cornicles black, long and thin, imbricate. Cauda black with many hairs, from one-quarter to one-fifth length of cornicles. Antennal segment i. larger than ii., iii. longer than iv., about as long as vi., with 30-36 sensoria over whole length ; iv. 0-1 ; v. 0 + 1 ; iv. and v. nearly equal. Anal plate black. Legs black, femora paler, often dull ferruginous, in some the tibiae paler basally. Wings large, stigma grey to brown ; veins black.

*Length* 2 to 2.8 mm.

FOOD PLANT. Elder (*Sambucus nigra*).

LOCALITIES. Wye, 28 vi. 14 and 3 viii. 26 ; Cambridge, 7 vi. 89 ; Kingston-on-Thames, 20 vi. 84 ; Okehampton, Devon, 17 vi. 10 ; Market Drayton, vii. 11 ; Abingdon, vii. 16 ; Fowey, vi. 12 ; Taplow, vi. 89 ; Sandwich, vii. 20 (F.V.T.) ; Common along lower reaches of Thames, Birmingham and district, Halifax,



Torquay, Monymusk, Aberdeenshire (F. Laing); Belgium (Schouteden); Germany (Kaltenbach, etc.); Tokyo, and Sapporo (Takahashi).



Fig 36.

A colony of apterous viviparous females of *Aphis sambuci* on Elder shoot.

*Observations.*—An abundant species when and where it occurs, often present in vast numbers encrusting the young Elder shoots. Both alatae and apterae may be found in June and July and by the end of the latter month most seem to leave the Elders. In all the

colonies I have observed one finds now and then apteræ in which the abdomen is paler and shows more or less distinct transverse bars. The larvæ differ very much from the adults, being bright green, with short cornicles and relatively long rostrum. The nymphæ are green to dark green, with greyish-green wing-pads and rather shorter legs. The incrustations of this black *Aphis* are always swarming with ants, the attendant ants usually being *Myrmica rubra* and *Lasius fuliginosus*.

APHIS RUMICIS Linnæus.

- Aphis fabæ* Scopoli.
- Aphis euonymi* Fabricius.
- Aphis atriplicis* Fabricius.
- Aphis papaveris* Fabricius.
- Aphis viciæ* Fabricius.
- Aphis thlaspeos* Schrank.
- Aphis armata* Hausmann.
- Cinara rumicis* Mosley.
- Aphis ulicis* Fabricius.
- Rumifex* Amyot.
- Euonymaphis* Amyot.
- Meconaphis* Amyot.
- Craccifex* Amyot.
- Aphis hortensis* (Fab.) Walker.
- Aphis indistincta* Walker.
- Aphis suffragans* Walker.
- Aphis inducta* Walker.
- Aphis translata* Walker.
- Aphis chærophylla* Koch.
- Aphis atriplicis* Buckton.
- Aphis euonomi* (Fab.) Swain.
- Aphis dahliæ* Mosley.
- ? *Aphis aparines* Schrank.

Linnæus, Syst. Nat. Ed., 10, I., 451 (1758); Fn. Suec., 217 (1746); Syst. Nat. Ed., 10, I., 452 (1758); Scopoli, Ent. Car., 136 and 139 (1763); Fabricius, Syst. Ent., 736 (1775); 737 (1775); Gen. Ins., 303 (1776); Spec. Ins., 390 (1781); Schrank, Fn. Boica, II., 118 (1801); Hausmann, Ill. Mag., I., 439 (1802); Mosley, Gard. Chron., I., 747 (1860) and 628 (*dahliæ*); Amyot, Ann. Soc. Ent. Fr., 2<sup>me</sup> Se. V., 478 (1847); Walker,

List. Homop. (B.M.), IV., 981 (1852); Zool., VI., 2211 (1848); Zool., VII., 35, App. (1849); App. xlv. (1849); Buckton, Mono. Brit. Aphid., II., 87 (1877); Swain, Univ. Calif. Publi. Ent., III., 1, 101 (1919); Kaltenbach, Mono. Pflanz., 82 (1843); Koch, Die Pflanz., 50 and 122 (1857); Walker, Ann. Mag. Nat. Hist., V., Se. 2, 17 (1850); Curtis, Farm Insects, 355 (1860); Fonscolombe, Ann. Soc. Ent. Fr., X., 162 (1841); Passerini, Aphid. Ital., 37 (1863); Riley and Monell, Bull. U.S. Geol. Surv., v., 1 (1879); Oestlund, Aphid. Minn., 61 (1877); Theobald, First Rept. Eco. Zool. (B.M.), 10 (1903); Rept. Eco. Zool., 1905, 44-47 (1906); idem., 1907, 104-107 (1907); Schouteden, Aphid. Belg., 226 (1906); Mordwilko, Horæ. Russ. Ent. Obrich., XXXI., 271 (1899); Gillette, Journ. Eco. Ent., III., 497 (1910); Theobald, Entomologist, XLIV., 19 (1911); Rept. Eco. Zool., 1911, 30 (1912); Journ. Eco. Biol., VIII., 94 (1912); Journ. Bd. Agri., XIX., 467-476 (1912); Bull. Ent. Res., IV., 329 (1914); and VI., 153 (1915); Canad. Ent., XLVIII., 234 (1916); Patch Maine Agri. Exp. Sta., 202 (1912); V. d. Goot, Holland. Blatt., 220 (1915); Das, Mem. Ind. Mus., VI., 203 (1918); Matsumura, Journ. Coll. Agri. Sapporo, VII., 6, 357 (1918); Haviland, Proc. Camb. Phil. Soc., XIX., pt. V., 226 (1919); Davidson, Ann. App. Biol., VIII., 1, 51 (1921); Bull. Ent. Res., XII., pt. 1, 81 (1921); Carpenter, Roy. Soc. Dublin Proc. n.s. 16, Nos. 25, 29 and 304 (1921); Ann. App. Biol., ix., 2, 135 (1921); Takahashi, Aphid. Formosa, I., 47 (1921); and II., 10 (1923); Willcocks, Sult. Agri. Soc. Bull., 1 (1922); Davidson, Ann. App. Biol., X., No. 1, 35 (1923); Glendenning, Proc. Ent. Soc. Brit. Columbia, No. 21, 41 (1924); Theobald, Ent. Mo. Mag., LXI., 78 (1925); Horsfall, Univ. Iowa Studies, No. 87, XI., 2 (1925); Theobald, Ent. Mo. Mag., LXI., 78 (1925); Moreira Boll. 2, Inst. Biol. d. Agricola, 17 (1925); Hall, Aphid, Egypt, 25, (1926).

There are many more American and other references.

*Stem Mother.* Dusky black or tinged and mottled with olive. Cornicles, cauda and anal plate black. Legs ochre-yellow, a large dark apical area to fore femora, still larger in mid and hind, about one-quarter of hind tibiæ dark and the tarsi. Antennæ dusky, of 5 segments. A pair of lateral papillæ on prothorax; a large pair on segments i. and vii. on abdomen, smaller ones between. The

black cauda is conical with several apically curved hairs. Cornicles cylindrical, imbricate, of varied length. The meso- and meta-thorax are merged with the abdomen, but the prothorax is distinct. Some show a certain amount of mealy coating.

*Length* 1.6 to 1.9 mm.

*Apterous viviparous female.* Globular, dull velvety or shiny black, now and then with white patches on the dorsum, a few inclining to olive-green; legs dull white or ochreous and black, most of mid and hind femora black, apex of tibiæ and the tarsi black; antennæ dull ochre, segment i. and ii. end of v. and all vi. black. Eyes dark. Pronotal lateral papillæ; marked lateral papillæ on segments i. and vii. of abdomen, smaller ones between. Cornicles and cauda black, former cylindrical and imbricate; cauda blunt, 4-5 curved hairs each side. Antennæ variable in length; segment i. longer than ii.; iii. a little longer than iv., iv. a little longer than v., black, but yellow in the middle. Length of cornicles and cauda vary at different times.

*Length* 1.5 to 2.5 mm.

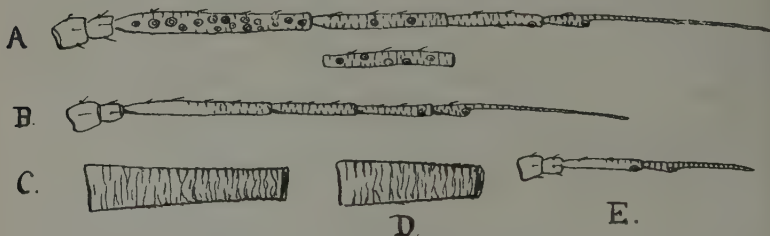


Fig. 37.—*Aphis rumicis* Fabricius.

A. Antenna of alate ♀; B. of apterous ♀; C. Cornicle of alate ♀; and D. of apterous ♀; E. Antenna of larva.

*Alate viviparous female.* Black to brownish-black; abdomen sometimes very deep olive-green, with black lateral spots and darker cross-bars; rather shiny; antennæ black, paler in middle; segment iii. with 10-22 sensoria over whole length; iv. with 0-8; v. with 0 to 2 + 1; segment i. larger than ii., iii. longer than iv.; iv. longer than v.; vi. about as long as iv. + v., its basal area nearly half as long as iv. Legs black, with pale tibiæ and bases to femora. Cornicles stout, moderately long, broadened at base, black, imbricate. Cauda partly black at sides and apex, rather

short, with numerous curved hairs. Pronotum with a blunt papilla each side; abdomen with a prominent pair on segments ii. and vii. and smaller ones between.

*Length* 1.5 to 2.5 mm.

*Nymph.* Black or slaty-grey. Abdomen with 4 to 5 downy-white patches on each side and others below them, irregular in number, size and position. Wing-cases black. Eyes black. Cornicles and cauda black. Legs dark, with pale femoral bases and also the tibiæ. Antennal segment iii. longer than iv.; iv. a little longer than v. Cauda short, with many inwardly curved hairs.

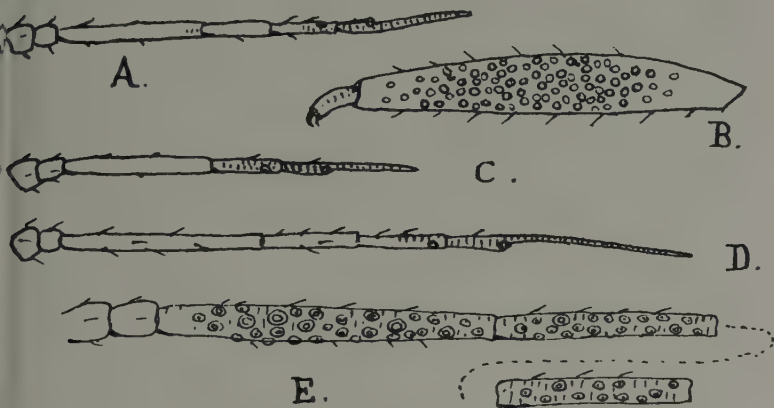


Fig. 38.—*Aphis rumicis* Fabricius.

A. Antenna and B. Hind tibia of oviparous ♀; C. Antenna of Stem Mother; D. of apterous viviparous ♀; E. of alate ♀.

*Oviparous female.* Apterous. Dull black, with more or less olive-green suffusion, some with rusty hues; antennæ dark, except segments iii. and iv., which are white to pale ochre; cornicles, cauda and anal plate black; fore and mid legs pallid, except apices of tibiæ and the tarsi; hind pair all black. Distinct prothoracic lateral papillæ. Abdomen with prominent lateral papillæ on segments i. and vii., smaller ones on other segments. Cornicles cylindrical. Cauda conical with several long curved hairs. Hind tibiæ broadened with many sensoria.

*Length* 1.3 to 1.9 mm.

*Male.* Alate. Shiny black; abdomen black, to deep olive-green, showing black bars and marks, the first 5 or 6 segments show black bands sometimes complete, at others broken, anal region all black. Antennæ dark. Cornicles and cauda black. Legs ochre to pallid yellow, some almost white, mid and hind femora dark, apex of fore pair and all the tibiæ dark; tarsi dark. Antennal segment iii. with 28 to 44 sensoria; iv. with 14 to 26; v. with 6 to 18 + 1. Prothorax with lateral papillæ. Abdomen with large lateral papillæ on segments i. and vii., smaller ones on remainder. Claspers dark; penis pale.

*Length* 1.1 to 1.9 mm.

**FOOD PLANTS.** Very numerous, including:—*Papaver somniferum*; *P. rhœas*; *P. hybridum*; *P. dubium*; *Meconopsis cambrica*; *Glaucium luteum*; *Rumex crispus*; *R. obtusifolium*; *R. sanguineus*; *R. acetosæ*; *R. acetosella*; *R. conglomeratus*; *R. dentata*; *R. hydrolapathum*; *Chenopodium polyspermum*; *C. album*; *Beta maritima*; *Atriplex patula*; *A. hortensis*; *Fumaria officinalis*; *Corydalis lutea*; *Fumaria muralis*; *Euonymus europæus*; *E. verrucosus*; *Viburnum opulus*; *Lathyrus ophaca*; *L. sylvestris*; *Vicia* spp.; *Allium cepa*; *A. porrum*; *A. schœnoptasum*; *Asparagus*; *Digitalis purpurea*; *Carduus arvensis*; *C. lanceolatus*; *C. palustris*; *C. pratensis*; *Humulus lupulus*; *Hedera helix*; *Dipsacus*; *Arctium lappa*; *Pimpinella magna*; *Anagallis arvensis*; *Artemisia vulgaris*; *Solanum officinale*; *S. dulcamara*; *S. nigrum*; *Conium album*; *C. maculatum*; *Galium* spp.; *Mentha* spp.; *Heracleum spondylium*; *Beta*; Borage; Garden Spinach; Pear; Apple; Gorse (*Ulex europæus*); Turnips; Valerian; Rhubarb; *Nasturtium*. Many others in America and Japan.

**LOCALITIES.** Europe generally; Africa; India; Formosa; Japan; United States and Canada; Brazil; Sakhalin (Takahashi). Apparently not common in Egypt (Hall).

*Observations and life-history.* This common polyphagous aphid is subject to much variation in colour according to the different plants it infests, also in regard to its mealy covering and size. There is also marked variation in the numbers of the antennal sensoria in the alatae, especially on iii. and iv.; variation may even be noticed on the two antennæ of the same insect, the smallest number on iii. so far observed is 10, the greatest 22;



on iv. they vary from 0 to 8 and on v. 0 to 2 + the primary one. There is also considerable variation in the relative lengths of the cornicles and cauda in the same stage and in the body hairs. This *Aphis* winters in the egg stage as a rule, the ova being laid in autumn on the *Euonymus*, *Rumex*, rarely on *Viburnum opulus* and in America on *Chenopodium*. I have also received sexuales on Potato, specimens being sent me in 1922 by Dr. Elze from Wageningen and the females deposited eggs on the haulm. The connection with *Viburnum* was first noticed by Dr. Horsfell in America and he sank Scopoli's *Aphis viburni* as a synonym of *rumicis*. On recently going over my collection I find all my specimens of *viburni* are distinct from *rumicis*. The eggs of *rumicis* are laid indiscriminately, some on young wood, most at the base of buds. They are at first dull yellow, but soon become black. The ova hatch in spring and give rise to the "Stem Mothers," which produce apterous viviparæ and by June nymphæ occur, these soon hatch into alatæ and during the latter month, on to July the winged forms migrate to a host of herbaceous plants, some of which they persist on, upon others they die off rapidly. Those that settle on Beans, Poppies and Mangolds multiply rapidly and frequently smother the plants. Those that have wintered on the Docks (*Rumex*) also breed rapidly on those plants and cause the leaves to curl up and later cluster on the flower heads. Some of these assume wings and fly away to various other plants, but others seem to persist on the Docks and to continue to reproduce in small numbers all the summer. Late in summer alatæ appear on the herbaceous plants, these return migrants produce egg laying females on the *Euonymus* and *Viburnum*, later alate males occur and fly and join the apterous oviparæ and fertilise them. Those that remain on *Rumex* produce their eggs there in this country. In America Horsfell has found the ova on *Viburnum opulus* and *Chenopodium album*. The young stem mothers on *Viburnum* developed on that shrub, but those on *Chenopodium* migrated to *Rumex* and they also developed on *Arctium*. Later he also found a great variety of hosts became affected. He was unable to obtain any data which might lead him to believe that migrants from any particular host were selective in their tastes or in other words that certain strains of *rumicis* depending on groups of plants have been evolved. From observations I made in 1910 and 1911 in this country it appeared

if this might be so. During his investigation Horsfell came across some interesting intermediate forms.

This species is often spoken of as the "Collier," Black Fly or Black Death. In some years it is most harmful to Broad Beans, Runners, French Beans and Mangolds. The swarms of them often kill whole fields of Beans, at other times they stunt the growth and cause the pods to become deformed by their constant sucking. In the attack on Mangolds they cause much leaf curling, just as they do on Docks. Many garden flowers are attacked, including Dahlias, Marigolds and Nasturtiums. On Dahlias it infests the flowers as well as the leaves. Mosley's *Aphis dahliæ*, is certainly this species. This Black Dolphin produces much Honey Dew which falls on the leaves, flowers and pods of the beans below and scorches them. Ants largely attend these Plant Lice. In some years vast swarms of these aphides appear and fly about covering everything, often alighting in such numbers that the foliage of the plants is hidden. It has especially been noticed that they, during such migrations, swarm on the tips of onion leaves and kill them. During these sudden migrations or "Blights" the insects are often killed off in masses by some fungoid enemy and remain when dead in masses on the leaves often before any young have been produced. An account of one of these large migrations is given in the Board of Agriculture Journal for 1912 (pp. 466-476). Das says that in Lahore it is present almost throughout the year, but is most abundant during the winter, when it is scarce in the plains; in May and June it occurs in the sub-hilly districts. It is subject to a large number of insect parasites, especially *Syrphid* larvæ and *Coccinellidæ*; now and then Chalcids attack it. In India, Das says, it is extensively attacked by a *Proctotrupid*. Fungi are the most effective control. Recently they have been found attacking Hops, where they occur in small round groups and cause the upper surface of the leaf to become yellow, but they do not flourish on the Hop. Now and then the Black Fly breeds very rapidly on young apple trees. Amongst the synonyms often given is *Aphis aparines* Kalt., but this is *cerasi*. Schrank's *aparines* may not be the same as Kaltenbach's, and may be *rumicis*. Kaltenbach's *A. ilicis* bears close structural features but can be demarked by the long antennal hairs and the much narrower dark abdominal bands in the *alatae*; without very careful examination one would say the Holly Aphis was *rumicis* when mature.

Borner (Nachr. d. Pflanzenschutzdienst, II., 8, 66-67), considers the following black Aphides distinct :

*Aphis euonymi* on *Euonymus*.

*Aphis rumicis* on *Rumex*.

*Aphis viburni* on *Snowball*.

*Aphis philadelphi* on *Philadelphus*.

The Black Fly on *Euonymus* he splits into two, differentiated by the length of the hairs and by the food plants, especially the hairs of the antennæ, legs and sides of the body.

The short haired ones he calls *euonymi*, the long haired *papaveris*. The short haired ones, he says, will not go to Beans, *Chenopodium*, *Beta* or *Papaver*, but the long haired ones will.

He also makes another black species on *Viburnum* which he calls *Aphis mordwilkoii* and separates it on biological facts and the presence of secondary olfactory organs on the fifth antennal segment. He transferred this to *Arctium Lappa*, *Rumex* and *Umbelliferae*. He says it produces no leaf curl either on *Viburnum* or *Arctium*. It is long haired like *papaveris*. He then goes on to say that *A. viburni* which causes leaf curl is not migratory and occurs from spring to autumn on the *Snowball*. His *A. philadelphi* occurs from spring to autumn on *Philadelphus* and causes leaf curl and is long haired like *papaveris*. *Aphis rumicis* he says has hairs slightly longer than *euonymi* and lives from spring to autumn on *Rumex* where it oviposits and does not migrate.

*Aphis viburni* Scopoli, as elsewhere stated, produces much leaf curl and certainly migrates, so Borner must be dealing with another species. With regards to the Black Fly on Docks (*Rumex spp.*) the alatae certainly migrate to Beans in this country and to many other plants. The Dock and Bean and Poppy black Aphides all have short hairs in this country, but vary a little in length. With us sexuales rarely occur on *Rumex*. In this country I cannot detect any marked long and short haired forms on *Euonymus*, except in a single apterous ♀ sent me from Dublin. The hairs, cornicles and antennal sensoria all vary even in the same colony, on *Euonymus*, *Vicia*, *Papaver* and *Rumex*, and on other of the many host plants. It is clear that we have only one common black Aphid in this country and that is *Aphis rumicis* Linnæus. With regard to Borner's *philadelphi* I cannot speak as I have never seen Aphides from that plant, but Mr. Laing adds: "I

have specimens from *Philadelphus* which I have been unable to separate from typical *rumicis*." With regards to Börner separating his *mordwilkoii* on account of secondary sensoria on antennal segment v., it may be mentioned that secondary sensoria occur now and then on that segment in *rumicis*, when on Beans, Poppies and Docks. The long-haired specimen (apterous) that I have from Ireland, taken on *Euonymus japonicus* is so close to *ilicis* that I cannot separate it.

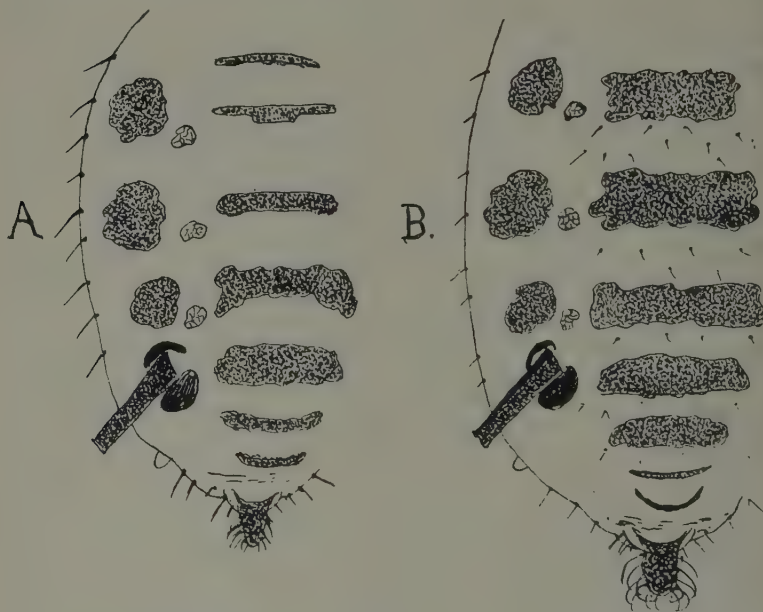


Fig. 39.

A. Body markings of *Aphis ilicis* Kalt.; B. of *Aphis rumicis* Fab.

#### APHIS ILICIS Kaltenbach.

Kaltenbach, Mono. Pflanz., 88, 64 (1843); Macchiati, 254, (1883); Schouteden, Mem. Soc. Ent. Belg., XII., 221 (1906).

*Apterous viviparous female.* Dull black, deep brown, or earthy colour, with darker mottlings; cauda, cornicles and anal plate black; antennæ brown, iii., iv. and v. whitish; legs black, base of femora and most of tibiæ whitish. Antennæ shorter than

body with long hairs ; i. wider than ii., iii. considerably longer than iv. ; iv. and v. about equal ; vi. a little longer than iii., base about one-third of flagellum. Rostrum yellow at base, apex dark, reaching to third coxæ. In cleared specimens the deep brown body shows dark cross bars. Cornicles rather thick, moderately long, about as long as antennal segment iv. Cauda broad, nearly as long as the cornicles, blunt, several *very* long hairs each side. The long hairs at once demark it.

*Length* 1 to 1.5 mm.

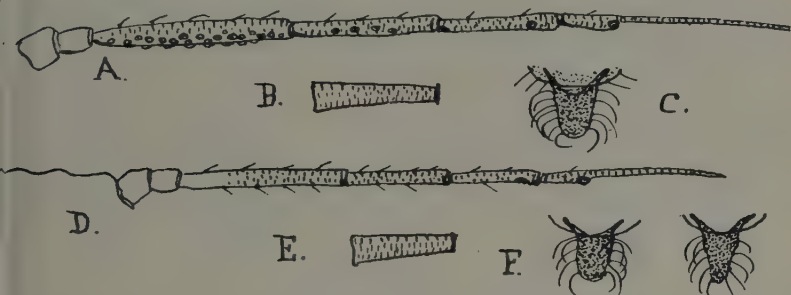


Fig. 40.—*Aphis ilicis* Kalténbach.

A. Antenna of alate ♀ ; B. Cornicle ; C. Cauda ; D.E. and F. of apterous ♀.

*Alate viviparous female.* Head and thorax shiny black. Abdomen deep brown to dull earthy colour, with black transverse bands and lateral spots. Antennæ, cornicles and cauda black. Rostrum yellow, apex brown, hairy, reaching second coxæ. Legs blackish-brown, base of femora and most of tibiæ yellowish-green. Antennæ nearly as long as body ; segment i. wider but no longer than ii. ; iii. a little longer than iv., shorter than vi., with 25 to 28 sensoria, along whole length, mainly on one side, rather small ; iv. about as long as v. with 4 to 6 sensoria ; base of vi. more than half of v. ; flagellum about as long as iii. ; iii. to vi. imbricate. Cornicles cylindrical, slightly expanded basally, about as long as antennal segment iii. ; imbricate. Cauda thick, blunt, about three-quarters length of cornicles, with many *black* curved hairs. A marked papilla between cornicles and cauda and on pronotum, other lateral papillæ small. Legs hairy. Stigma greyish to greenish-brown, some yellowish-brown.

*Length* 1.8 to 2.2 mm.



FOOD PLANT. Holly (*Ilex aquifolium*).

LOCALITIES. Ventnor, Isle of Wight, vi. 09 ; Wye, vi. and vii. 1911 and viii. 26 ; Battle, vii. 89 ; Panton, near Wragby, vii. 10 ; Wisley, vi. 26 (F.V.T.) ; Bangor, 25 vii. 25 (C. L. Walton). Sevenoaks, Fulham, Wimbledon, Lynmouth, New Forest (F. Laing).

*Observations.* The dark coloured Aphis now and then swarms on the leaves and shoots of the Holly. When present in numbers it causes the leaves to curl up and the tips of the shoots become deformed. It bears a strong resemblance to *rumicis*, but the alatae have narrower abdominal bars and the antennæ long hairs. It is much attended by ants.

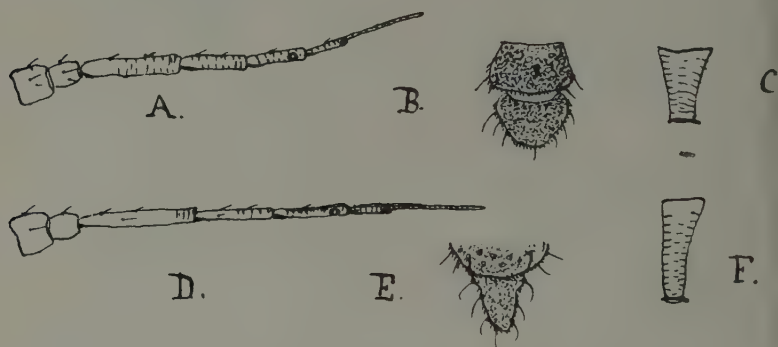


Fig. 41.

A.B. and C. *Anuraphis angelicæ* Koch ; D.E.F. *Aphis hederæ* Kaltenbach ;  
Antennæ, Cornicles and Cauda.

#### APHIS HEDERÆ Kaltenbach.

Kaltenbach, Mono. Pflanz., 89 (1843) ; Koch, Die Pflanz., 91, 31, fig. 121 (1854) ; Buckton, Mono. Brit. Aphid., II., 75, pl. LX., figs. 1 and 2 (1877) ; Walker, Ann. Nat. Hist., Se. 2, VI., 47 (1850) ; Walker, List. Homop. (B.M.), 995, 103 (1852) ; Passerini, Aphid. Italicæ, 32 and 43, 29 (1863) ; Macchiati, 240 (1883) ; Essig, Pomona Coll. Jour. Ent., II., 334-335, fig. 124 (1910) ; Schoutenden, Mem. Soc. Ent. Belg., XII., 221 (1906) ; Cholodkovsky, Rev. Russ. d'Ent., XV., 2, 147, 1915.

*Apterous viviparous female.* Dark brown, dull, globose, some smoky black. Cornicles, anal plate and cauda black. Antennæ



Shorter than body ; segments i. and ii. and apex dark. Legs yellowish-white, apices of femora and tibiæ and the tarsi black. Segment i. of antennæ wider but no longer than ii. ; iii. longer than iv., as long as or even longer than vi. ; iv. as long as v. ; vi. with basal area half v. and nearly half the flagellum ; a few hairs. Rostrum pale at base, apex dark, reaching to or nearly to third coxæ. Cornicles cylindrical, nearly as long as antennal segment iii. ; thin ; somewhat broadened basally. Cauda about half length of cornicles, spinose and somewhat broader, 3 hairs each side. Pronotum with a marked papilla each side ; a prominent papilla between second and third pair of legs.

Length 1 to 1.4 mm.

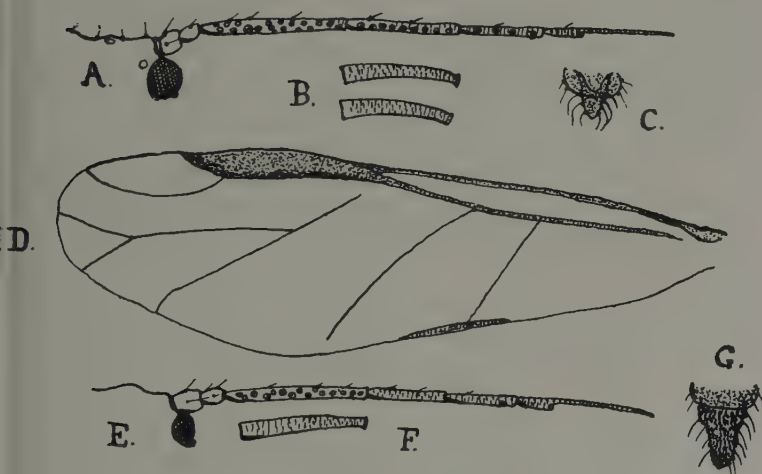


Fig. 42.—*Aphis hederæ* Kalténbach.

Alate ♀ ; A. Head and antenna ; B. Cornicles ; C. Cauda ; D. Fore wing ; E. Antenna ; F. Cornicle ; G. Cauda ; Specimen from *Aralia*.

*Alate viviparous female.* Black ; abdomen dull brown. Cornicles and cauda black. Antennæ brown, shorter than body. Rostrum pale at base, apex black, reaching to second coxæ or just beyond. Segment i. of antennæ longer than ii. ; iii. longer than iv., not quite so long as vi., with 17 to 20 round sensoria over whole length ; iv. longer than v., with 8 to 12 sensoria ; v. with 0 to 6, excluding primary one ; vi. with basal area half length of v.

and less than half flagellum. Cornicles about half length of antennal segment iv., imbricate, cylindrical, slightly expanding basally. Cauda scarcely half length of cornicles; 4 hairs each side. Rostrum reaches second coxæ. Cubital cell of wings half length of stem; stigma brown; veins brownish-yellow; in some the wings are slightly stained.

*Length* 1.5 to 1.9 mm.

FOOD PLANTS. Ivy (*Hedera helix*); *Aralia* sp.?; *Platanthus bifolia* (Cholodkovsky).

LOCALITIES. Fairlight and Old Roar near Hastings; Wye, 23 v. 12; vii. 22; vi. 25; Cambridge, 7 v. 14; Hastings, 2 vi. 90; Reading, 12 vi. 19; Kingston-on-Thames, 2 v. 82; Little Hadham, Herts., 7 vi. 14; Taplow, vii. 90; Bath, xi. 92; Minehead, vi. 10; Fallapit, Devon, v. 12 (F.V.T.); Chichester (Buckton); Great Salkeld, xi. 12 (Britten); Doncaster, vi. 25 (Dallman); Criccieth, North Wales, 7 vi. 11 (F.V.T.); Bangor, xi. 22 (Walton); Bournemouth, Lynmouth, Newton Abbot, Birmingham, New Forest, Midhurst, occasionally around Aberdeen (F. Laing); Berwick, 6 viii. 47 (Walker, in Nat. Mus., Ireland); Italy (Passerini); Calabria (Macchiati); Belgium (Schouteden); Germany (Kaltenbach, Koch, etc.); Russia (Cholodkovsky); Bergen (F.V.T.).

*Observations.* A common species on Ivy. It lives on the young shoots and under the tender leaves, which it curls up and it also distorts the shoots. There is much variation in the antennæ; some show 1 to 5 sensoria on segment v. in the same colony, others none at all. Kaltenbach recorded it in August and September. Walker (Cat. Homop.) describes the apterous female as "dull buff or dark red, covered with a white bloom. . . . nectaria dark brown as long as  $\frac{1}{10}$  of the body." I have never seen any specimens like this. Probably many variations in colour occur in different parts and in different seasons.

Several other plant lice occur with this species in this country, such as Koch's *Anuraphis angelicæ* and my *Rhopalosiphoninus waltoni*, but the true *hederæ* can at once be told from these by the cylindrical cornicles and the prominent cauda.

## APHIS EPILOBII Kaltenbach.

Kaltenbach, Mono. Pflanz., 64 (1843); Buckton, Mono. Brit. Aphid., II., 71, pl. LVIII., figs. 3, 4 (1877); Koch, Die Pflanz., 1143 (1854); Schouteden, Mem. Soc. Ent. Belg., XII., 220 (1906); Del Guercio, Redia VII., 317 (1911).

*Apterous viviparous female.* Oval, pointed behind, dark green to dull black, with white meal. Head dark and broad. Eyes black. Cornicles and legs dirty-yellow, apices of femora and tibiae dark; tarsi dark. Antennæ dark, except segment iii. which is dull yellow. Cauda black. Antennæ much shorter than the body; segment i. wider but scarcely longer than ii.; iii. short, a little longer than iv.; iv. very slightly longer than v.; base of vi. a little shorter than v., the flagellum about twice as long; iii. to vi. markedly imbricated, a few hairs on the segments. Head flat in front with a few hairs. Eyes large. Rostrum reaches to the second coxæ, rarely to the third. Cornicles about as long as antennal segment iii., wider, delicate, showing very faint imbrication. Cauda not quite so long as the cornicles, spinose, the spines widely separated; three hairs each side and two or three apical; anal plate also dark and very spinose. Legs

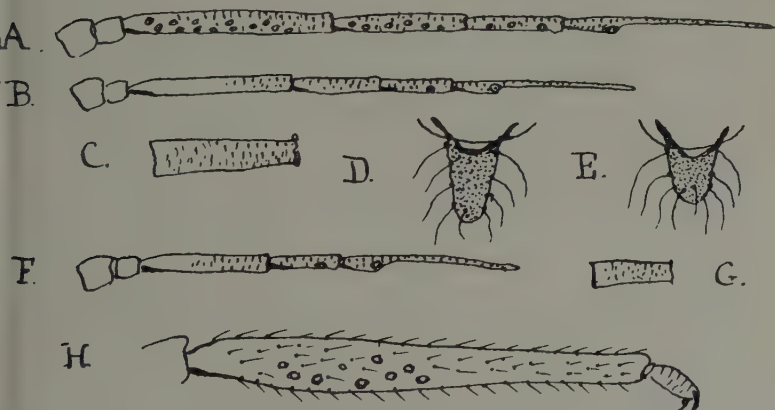


Fig. 43.—*Aphis epilobii* Kaltenbach.

A. C. and D. Alate ♀ antenna, cornicle and cauda; B.E. Apterous ♀; F.G.H. Oviparous ♀.

moderately long ; tibiæ with many hairs. In potashed specimens a row of dark dots are seen on each side of the abdomen.

*Length* 1.7 to 1.9 mm.

*Oviparous female.* Apterous. Much the same colour as the former. Antennæ less than half the length of the body, of 5 segments ; basal one larger than ii. ; iii. nearly twice as long as iv. ; basal area of v. a little shorter than iv. ; the flagellum not quite three times as long ; iii. to v. imbricated. Eyes large. Head flat in front with a few rather long hairs. Rostrum reaches to 3rd coxæ. Cornicles rather short cylindrical, much shorter than antennal segment iii., delicate. Cauda dark, spinose, nearly as long as cornicles and broader, spines faint and far apart, three long hairs each side and three placed apically. Anal plate dark and spinose, some long hairs. Body with small dark lateral spiracular spots and two large dark spots before the cauda, with numerous hairs arising from small papillæ (seen in potash mounts). Legs moderately long ; hind tibiæ not widened but with several unequal sized sensoria on the basal half, not extending to the base ; some in closely approximated pairs ; hairy.

*Length* 1.6 to 1.9 mm.

*Alate viviparous female.* Dull greenish-black ; cornicles dirty yellowish brown. Legs, except femora and tibiæ, which have dark apices, same colour as the cornicles. Cauda and anal plate deep brown to black. Legs with hairy tibiæ, a few hairs on femora at apices. The colour of the body varies, some being quite black, others greyish and some as described by Kaltenbach, with dull brownish-red stripes on the body. Antennæ a little shorter than body ; segment i. a little wider but no longer than ii. ; iii. longer than iv., with 12 to 14 sensoria ; iv. a little longer than v., with 6 to 8 sensoria ; v. with 0 to 3 sensoria + the usual sub-apical one ; vi. with base more than half of v. ; the flagellum three times length of base. Rostrum reaches to or nearly to the second coxæ. Cornicles cylindrical, imbricated and equal to segment iv. of antennæ. Cauda nearly equal in length to the cornicles, projecting, spinose, with numerous long curved hairs.

*Length* 2 to 2.3 mm.

FOOD PLANTS.—Willow Herbs (*Epilobium montanum* and *E. pubescens*).

LOCALITIES. Southgate, 3 viii. 47 and 12 x. 47 (Walker); Wanstead; Haslemere (Buckton); Wye, 17 vii. 10 (F.V.T.); Roche Abbey, West Yorks., 13 ix. 24 (Dallmann); Templemore, North Tipperary, 4 viii. 24 (Stelfox).

*Observations.* A very marked species which does not appear to be very common, any way in the South. I have never found the alate females, the description being drawn up from two of Walker's slides in the National Museum of Ireland, which also contain oviparous females. Oviparous females were also sent me by Mr. Dallman, they are very marked, the sensoria on the hind tibiae being peculiar in disposition.

#### *APHIS JACOBÆ* Schrank.

Schrank, Fn. Boica, II., 123, 1242 (1801); Kaltenbach, Mono. Pflanz., 68, 69 (1843); Koch, Die Pflanz., 95, figs. 127, 128, nec 95, figs. 91, 92 (1854); Walker, Ann. Mag. Nat. Hist., Se. 2, VI., 44; Zool., VIII., App. civ. (1850); Buckton, Mono. Brit. Aph., II., pl. LXII., figs. 1-4 (1877); Schouteden, Mém. Soc. Ent. Belg., XII., 221 (1906)

*Apterous viviparous female.* Dull dark green to blackish-green with greenish bands in some specimens. Antennæ shorter than body; black, except segment iii. which is dirty white to dull ochreous. Cornicles, cauda and anal plate black. Legs black, base of femora pale yellow. Rostrum greenish, apex black, reaching to third coxæ. Cornicles rather long, imbricate. Cauda and anal plate with a few hairs; antennal segment iii. larger than iv.; iv. a little longer than v. A marked papilla each side of pronotum and 4 each side of abdomen, cephalad of cornicles.

*Length* 1.5 to 1.6 mm.

*Alate viviparous female.* Shiny black; abdomen dark green to almost blackish-green. Antennæ, cornicles, cauda, anal plate and rostrum black. Antennal segment iii. with 17-20 sensoria; longer than iv.; iv. with 0 to 3 sensoria; iv. and v. nearly equal. Legs black; tibiae dull yellow, also base of femora, especially of fore legs; tibiae hairy. Eyes black. Cauda about half cornicles; hairy. A marked papilla each side of pronotum and 4 each side of abdomen cephalad of cornicles and one between cauda and cornicles. Wing insertions yellowish; stigma grey-brown; veins black.

*Length* 1.7 to 1.8 mm.

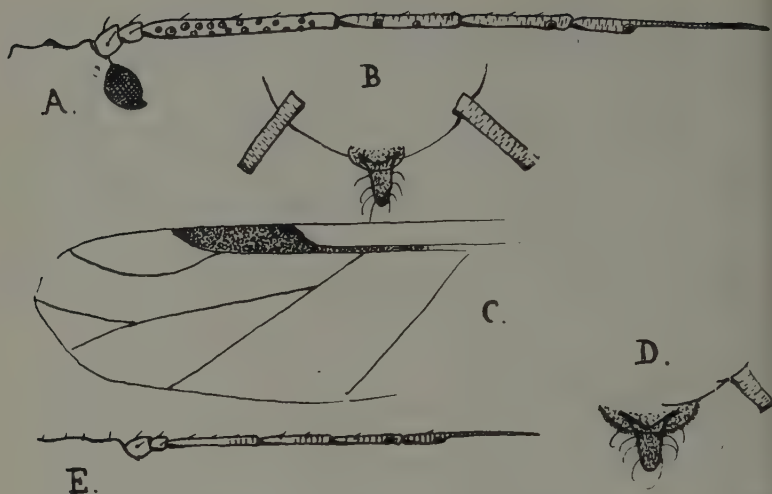


Fig. 44.—*Aphis jacobæ* Schrank.

A. Head and antenna; B. Cornicles and cauda; C. Apex of wing of alate ♀; E. antenna and D. cauda and anal plate of apterous ♀.

FOOD PLANT. Ragwort (*Senecio jacobæ*).

LOCALITIES. Wye, vii. 14; Herne Bay, 15 vii. 11; Folkestone, 17 vii. 21 (F.V.T.); Germany (Kaltenbach); Belgium (Schouteden).

*Observations.* According to Buckton this deep green and black species is common in June and July. Kaltenbach refers to it in July and August. It is often found in company with *Aphis cardui* from which it can be told by not being shiny. The cauda is relatively much longer than in *A. cardui*, which comes in *Anuraphis*. Buckton's material seems to be composite.

APHIS VIBURNI Scopoli.

Scopoli, Ent. Carn., 136, n. 396 (1801); Schrank, Fn. Boica, II., 111, n. 1203 (1801); Fabricius, Ent. Syst., IV., 216, 28 (1793); Koch, Die Pflanz., 122, figs. 165-166 (1854); Kaltenbach, Mono. Pflanz., 78, 56 (1843); Buckton, Mono. Brit. Aphid., II., 77, pl. LXI. (1877); Schouteden, Mem. Soc. Ent. Belg., XII., 229 (1906); Theobald, Ent. Mo. Mag., lxi., 78 (1925); Haviland, Proc. Camb. Phil. Soc., XIX., 5, 266-269.



*Alate viviparous female.* Very similar to *rumicis* in general appearance; head and thorax black, abdomen deep green with narrow median irregular dark bars and dark lateral spots. Antennæ, cornicles and cauda deep olive-green to black, especially the last two. Antennæ pale at base of segment iii.; i. a little larger than ii.; iii. longer than iv., with 12 to 18 unequal sized sensoria scattered over it; iv. with 0 to 5, usually 0; v. with only the primary sensorium. Cauda with several curved hairs each side. Hairs on antennæ, legs, and body of moderate size. Lateral abdominal and pronotal papillæ normal.

Length 2 mm.

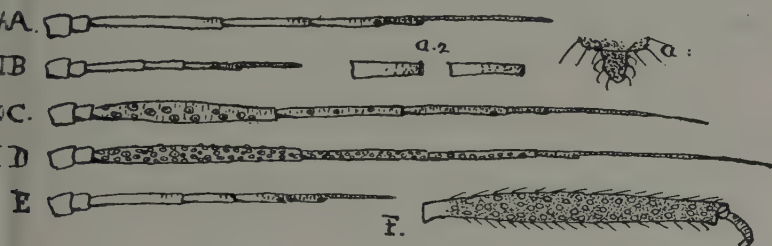


Fig. 45.—*Aphis viburni* Scopoli.

A. Antenna of apterous ♀, a<sup>1</sup> cauda, a<sup>2</sup> cornicles; B. Antenna of Stem Mother; C. Of alate ♀; D. Of male; E. Of oviparous ♀; F. Hind tibia of oviparous ♀.

*Apterous viviparous female.* Sooty black, blackish-brown, dull greenish-black, greyish-black, a few dirty green. Cauda and cornicles black; antennæ black at base and apex, middle white to dull yellowish; segment i. larger than ii.; iii. longer than iv.; iv. and v. nearly equal; hairs moderately long. Cauda bluntly pointed, about two-thirds of cornicles, 3 hairs each side and 1 to 2 apical. Lateral abdominal papillæ normal; pronotal papillæ large.

Length 1.4 to 1.8 mm.

*Oviparous female.* Deep greenish-yellow to green; antennæ, legs and cauda dark; a few specimens citron yellow. Cauda about one-third of cornicles, much thicker, apex rounded, with several long hairs. Hind tibiæ slightly swollen, with sensoria over whole surface, rather long, much narrower than in *rumicis*.

Length 1.5 to 1.7 mm.

*Male.* Alate. Antennæ long; iii. with 48 to 56 sensoria over whole length; iv. with 22 to 28 over whole length; v. with 7 to 8 + 1; iii. much longer than iv.; iv. a little longer than v.

Buckton says the male may be either alate or apterous, according to Sulzer.

FOOD PLANT. *Viburnum opulus*.

LOCALITIES. Wye, v. to x. every year; Worcester, 18 x. 12; Okehampton, 4 vii. 88; Hastings, vii. 96; Kingston-on-Thames, v. to vii. 94; Oxford, viii. 17; Lymington, viii. 15; Exeter, v. 09; Bournemouth, v. 09; Newmarket-on-Fergus, Ireland, vii. 91 (F.V.T.); Newcastle-under-Lyme, vi. 26 (Dr. Dodd); Dublin, vii. 24 (Stelfox); Kew Gardens; Harrow; Epsom; Natural History Museum Grounds (F. Laing).

*Observations.* Apparently a common species on the Guelder Rose (*Viburnum opulus*). It curls the leaves up into crisp tufts and also occurs in the flower heads. In June and early July most become alate and migrate, but where to we do not know. Some few always persist on the *Viburnum* if any tender growth remains and I have found a few right into the autumn, when alatae return and produce the oviparae. It bears a strong resemblance to *rumicis*, the oviparae are, however, very distinct in regard to the hind tibiae and the bars on the alate ♀ body are much narrower. It is often harmful in gardens.

APHIS LANTANÆ Koch.

Koch, Die Pflanzenlaus, 105, pl. XIX, figs. 141, 142 (1857); Theobald, Ent. Mo. Mag., LXI., 78 (1925).

*Alate viviparous female.* Head and thorax deep blackish-brown to black; thoracic lobes deep shiny black; abdomen deep olive green to deep greenish-brown, with dark lateral spots and dark transverse bars across the middle of abdomen; in some these may merge and form a large black dorsal patch and in a few the abdomen is nearly all dark; venter paler, greenish-brown. Lateral papillæ to the abdomen normal. Antennæ deep olive green; shorter than body. Cornicles and cauda black. Anal plate black. Legs olive green to deep green; mid and hind femora deep olive-green to almost black, except just at base; apices of tibiae dark and traces of dark colour at bases; tarsi dark.

Antennæ markedly hairy. Legs hairy. Segment i. of antennæ wider but no longer than ii.; iii. longer than iv., much shorter than vi., with 20 to 28 sensoria; iv. a little longer than v., with 5 to 7 sensoria; base of vi. more than half v.; flagellum longer than iii.; i. to v. with many rather long fine hairs, some of which are set almost at right angles. Cornicles cylindrical, rather narrow, about as long as antennal segment iv.; imbricate. Cauda more than half length of cornicles, bluntly acuminate, with many fine brown hairs. Anal plate rather large, rounded apically, with several fine hairs. Rostrum long, acuminate, reaching past third coxæ. Many fine hairs on femora and more on the tibiæ.

Length 1.9 to 2.5 mm.

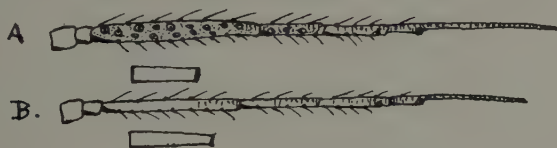


Fig. 46.—*Aphis lantanæ* Koch.

A. Antenna and cornicle of alate ♀; B. of apterous ♀.

*Apterous viviparous female.* Deep olive green to deep brownish-green, with darker transverse bars and lateral spots the latter now and then merge into a lateral line. Cornicles deep olive green to almost black, paler at bases, often almost yellow at base. Cauda dark, also anal plate. Legs olive green to almost yellow; apices of tibiæ and the tarsi dark; mid and hind femora mainly deep olive green to deep brown, bases paler. Legs very hairy. Rostrum deep yellow to olive-green, apex dark. Eyes deep reddish-black. Antennæ yellow to pale olive green; segments i. and ii. black; v. and vi. deep olive green. Antennæ shorter than body; segment i. wider than ii.; iii. much longer than iv., but shorter than vi.; basal area less than half of v.; flagellum slightly longer than iii.; all segments with rather numerous long, outstanding hairs, except on vi.; rostrum long, pointed, reaching past third coxæ. Cornicles rather long, narrow, cylindrical, imbricate, about as long as antennal segment iii. Cauda thick, about half length of cornicles, bluntly acuminate, with many fine hairs. Pronotum with a large papilla each side;

also one between 2nd and 3rd legs and five small ones on each side of body, difficult to detect. Femora and tibiæ with many rather long, fine outstanding hairs. A few scattered hairs on body, most prominent on apical segment.

*Length* 2 to 2.2 mm.

*Oviparous female.* Apterous, green; apices of antennæ, cornicles and cauda dark. Eyes deep red. Antennæ about half length of body; segment i. much larger than ii.; iii. a little longer than iv. and shorter than vi.; iv. and v. about equal; base of vi. about two-third of iv.; flagellum twice to three times as long as basal area. Cornicles black, thick, cylindrical, in some a little swollen at bases; longer than antennal segment iii.; imbricate. Cauda about one-third length of cornicles, several fine hairs each side. Anal plate rounded, with a few hairs. Abdomen with a few scattered hairs; longest on apical segment. Rostrum broad and thick, reaching past second coxæ. Legs short and thick, especially the hind pair; hind tibiæ very thick and stumpy, with outstanding hairs on one side and with many pale rounded sensoria. A few hairs on femora and some on head.

*Length* 1.2 to 1.5 mm.

*Male.* Alate. Head and eyes large. Antennæ shorter than body; segment i. much larger than ii.; iii. thick, with 17 to 20 oval and round various sized sensoria; iv. about as long as v., with 4 round sensoria; v. with one large sensorium and a small sub-apical one; vi. with basal area more than half v.; flagellum much longer than iii. Cornicles dark, not quite so long as segments iii. and iv. of antennæ; cylindrical, rather narrow, imbricate. Cauda bluntly triangulate, about half length of cornicles.

*Length* 1.5 to 1.7 mm.

FOOD PLANTS. Wayfaring Tree (*Viburnum lantana*); Guelder Rose (*Viburnum opulus*).

LOCALITIES. Wye, 11 vii. 11; 22 x. 15; Little Hadham, 14 vii. 15.

*Observations.* A very distinct species which can at once be told from *A. viburni* Scopoli by the hairy antennæ and more hairy legs. The oviparous female has also much thicker and

shorter hind tibiæ. Koch's figures exactly agree with the insects I describe here and there is no doubt that it is his *lantanae*, but I find it subject to much variation in colour.

*APHIS LANTANÆLLA* Theobald.

Ent. Mo. Mag., LXI., 77 (1925).

*Alate viviparous female.* Easily demarked from *A. lantanae* Koch by the non-hairy antennæ and legs, much larger size and from *viburni* Scopoli, by its much heavier build, different antennæ, cornicles and cauda. Antennæ dark, less than half length of body; segment i. larger than ii.; iii. longer than iv. and shorter than vi., with 30 to 32 oval and round irregular sensoria; iv. much longer than v., with 8 to 12 sensoria, oval and round; v. with usual primary sensorium and 0 to 6 secondary ones; vi. with basal area more than half v.; flagellum about as long as iii. Eyes large; ocular process prominent. Cornicles black, about two-thirds length of antennal segment iii., cylindrical or slightly swollen before apices, which are contracted; markedly imbricate. Cauda rather small, narrowly triangulate, about one-third length of cornicles; 2 hairs one side, 3 the other, and a sub-apical median one. Anal plate rounded, rather broad; 2 marked hairs on body each side of cauda. Legs rather long, femora dark, except at base; base of first pair of more pallid hue than others; apices of tibiæ and the tarsi dark; femora and tibiæ with very short hairs sloping forwards. A few hairs on body and small lateral papillæ.

Length 2.8 to 3 mm.



Fig. 47.—*Aphis lantanælla* Theobald.

A. Antenna of alate ♀; B. of male; C. Of oviparous ♀; F. and D. Cornicles; E. Hind tibia and cornicle of oviparous female.

*Apterous viviparous female.* Globular, dark; base of antennal segment iii. and middle of tibiæ paler. Antennæ short, about one-quarter length of body; segment i. larger than ii.; iii. longer

than iv., but not so long as v. ; iv. and v. about equal ; vi. with basal area about half length of flagellum, which is not quite so long as antennal segment iii. ; 3 stiff hairs on vi. and 1 on each of following segments. Cornicles not quite so long as antennal segments iii. and iv., dark, cylindrical or slightly expanding before apex, which is constricted ; imbricate. Cauda black, about one-third length of cornicles, with 2 hairs each side and 1 near apex. Rostrum reaches to second coxæ, apical segment narrow and longer than penultimate. The rather long, thick legs have hairs on femora and tibiæ and there are a few outstanding ones on the body. Lateral papillæ small.

*Length* 2.5 to 3 mm.

FOOD PLANTS. *Viburnum lantana* and *V. opulus*.

LOCALITIES. Wye, 15 vi. 14 and 10 vii. 14 (F.V.T.) ; Newcastle-under-Lyme, vi. 26 (Dr. Thomas) ; Walton Heath 1923 (F. Laing) ; Bangor, v. 23 (C. L. Walton) ; Kilmarnock, Ayrshire, v. 26 (D. Millen) ; Portumna, Co. Galway 24, x. 25 (Stelfox).

*Observations.* Described from a large colony found with *A. viburni* Scopoli. It differs from it in size, cornicles and antennæ. It also occurred on another tree with *A. lantanæ* Koch from which it can at once be told by the non-hairy antennæ. The only colour note kept was "a dark coloured insect." It does not appear to attack *Viburnum plicatum* (Millen).

APHIS DIPHAGA Walker.

List. Homop. (B.M.), IV., 1042, 316 (1852).

*Apterous viviparous female.* Pale yellow to citron yellow, oval, convex, smooth skinned, some mottled with green or deeper yellow ; antennæ pale yellow, apices dusky ; rostrum yellow, apex dusky. Cornicles deep olive green to deep brown. Legs yellow, rather long, apices of tibiæ and the tarsi dusky. Cauda deep yellow or pale green. Antennæ nearly as long to a little longer than body ; segment i. larger than ii. ; iii. longer than iv. ; iv. very little longer than v. ; the latter dusky at apex ; vi. with basal area half v. ; flagellum a little longer than iii. Rostrum reaching just past second coxæ. Eyes red. Cauda about



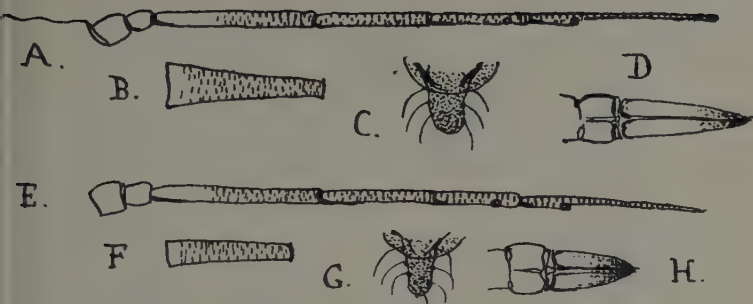


Fig. 48.

*Aphis diphaga* Walker head and antenna A.; B. Cornicle; C. Cauda; D. Apex of rostrum; E.F.G.H. the same of apterous ♀.

Half of cornicles, prominent, 3 hairs each side. Cornicles rather thick, cylindrical, expanding towards base, about as long as antennal segment iii.; imbricate. A small lateral papilla on abdominal segment i. and a small pronotal papilla each side. The specimen also show traces of other lateral papillæ on abdomen.

Length 1.8 mm.

Walker describes the alate female as follows:—"Linear, shining black or very dark brown; feelers and nectaries black; legs pale yellow; feet, tips of thighs and shanks black; wings nearly twice length of the body; wing ribs and rib-veins pale yellow; brands and veins very pale brown." He described the apterous female as follows:—"Small, oval, convex, smooth not shining, pale yellow and mottled with green; feelers pale yellow with black tips, a little longer than the body; mouth pale yellow with a black tip; nectaries dark green, about one-quarter length of body; legs long, pale yellow; feet and tips of shanks black."

FOOD PLANT. *Epilobium* sp.

LOCALITY. Wye, 2 viii. 13.

Observations. I have only found the apterous females of this species and in very small numbers mixed with *Aphis præterita* Walker.

## APHIS LABURNI Kaltenbach.

*Aphis medicaginis* Koch.*Aphis leguminosæ* Theobald.*Aphis genistæ* Theobald (non Kalt.).*Aphis cistiella* Theobald.*Aphis rumicis* Maki.

Kaltenbach, Mono. Pflanz., 85, 61 (1843); Koch, Die Pflanz., 86, figs. 114 (*laburni*); 94, figs. 125, 126 (*medicaginis*) (1854); Passerini, Aphid. Ital., 32, 45 (1870); Ferrari, Aph. Liguria, II., 71, 62 (1872); Schouteden, Aph. Belg., XII., 222 (1906); Buckton, Mono. Brit. Aph., II., 86, pl. LXXV., figs. 1-3 (1877); Gillette, Journ. Eco. Ent., I., 177 (1908); Theobald, Bull. Ent. Res., VI., 11, 121, fig. 16 (1915); Van der Goot, 98-101 (1917); Essig and Kuwana, 71, fig. 17 (1918); Essig, Pomona. Coll. Journ. Ent., III., 527, fig. 171 (1911); Davidson, Journ. Eco. Ent., I., 302 (1909); Cockerell, Canad. Ent., XXXVI., 263 (1904); Gillette, Journ. Eco. Ent., I., 177 (1908); Swain, Univ. Calif. Pub. III., 114 (1919); Maki, Agri. Exp. Sta., Formosa, Bull. 103, (1916); Das, Aphid. Lahore, 203 (1918); Takahashi, Philipp. Journ. Sci., 25, 5, 421 (1922) and Aphid. Formosa, I., 46 (1921) and II., 101 (1923); Theobald, Soc. Roy. Ent., Egypt, 1923, 47 (1923); Theobald, Bull. Soc. Roy. Egypte, vii., 45 (1922) (= *cistiella*); Hall, Aphid. Egypt, 20 (1926).

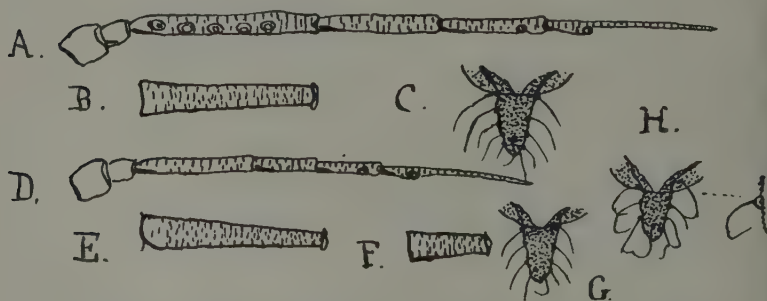


Fig. 49.—*Aphis laburni* Kaltenbach and *A. genistæ* Scopoli.

A. Antenna of alate ♀ *laburni*; B. Cornicle; C. Cauda; D. Antenna of apterous ♀; E. Cornicle; H. Cauda; G. and F. of *genistæ* cauda and cornicle.

*Alate viviparous female.* Black; shiny. Antennæ black; iii. to v. pale, brown, dull yellow to almost black; iii. and iv. often almost white. Cornicles and cauda black. Legs black, tibiæ dull white to dirty yellow; femoral base pale. Antennæ about half body; i. larger than ii.; iii. a little longer than iv., 3 to 6 sensoria, usually in middle, if 6 along whole length; iv. a little longer than v.; base of vi. about half v. Cornicles black, long, cylindrical, as long as or a little longer than iii. Cauda black, prominent, narrow, as thick or a very little thicker than cornicles and almost half their length, with 3 to 4 hairs each side and 2 to 3 sub-apical curved ones. Tibiæ slightly hirsute. Wings normal, somewhat tinted and very shiny; stigma brownish, insertions and some veins yellowish-green. A marked abdominal papilla between cornicles and cauda (my mounted specimens show no others as seen in the apteræ).

Length 1.6 to 2 mm.

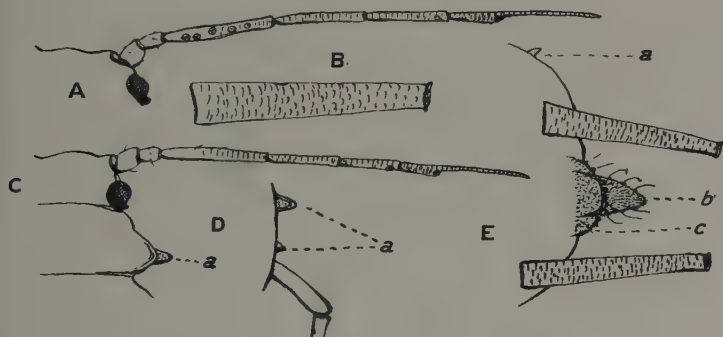


Fig. 50.—*Aphis laburni* (*leguminosæ* Theobald).

A. Head and antenna of alate ♀; B. Cornicle; C. Head and antenna of apterous ♀; D. Lateral abdominal tubercles; E. (a) Abdominal papilla Cauda (b); Anal plate (c); and Cornicles.

*Apterous viviparous female.* Black, with dull bluish white meal or shiny. Antennæ black; segments iii. and iv. and base of v. pale. Cornicles and cauda black. Legs black, except tibiæ, which are pale with dark apices; femora with a small basal pale area on fore and mid legs and a large one on the posterior pair. Antennæ shorter than body; segment i. black, larger than ii. which is also dark; iii. longer than iv.; iv. and v. about equal;

vi. not quite so long as iv. + v., its basal area more than half length of v. and about half of flagellum. Cornicles thick, cylindrical, slightly expanding basally, pointing outwards, imbricate, longer than antennal segment iii. Cauda long, narrow, about half length of cornicles and scarcely thicker, with 4 long hairs each side, very spinose. A prominent papilla each side of pronotum and a larger one between mid and hind legs, a smaller one between cauda and cornicles.

*Length* 1.5 to 1.9 mm.

FOOD PLANTS. *Cytisus laburnum*; *Spartium scoparium*; *S. junceum*; *Genista* sp.; *Poterium officinale*; *Leguminosæ*; *Indigo* (India); *Deutzia scabra*; *Hibiscus syriacus*; *Zelkora acuminata*; *Vigna sinensis* (Takahashi); *Phaseolus lunatus*; *Acacia*; *Melilotus*; *Medicago*, and many other plants.

LOCALITIES. Ashford, Kent, 7 v. 10; 20 viii. 13; Wye, 7 vi. 07; Lydd, ix. 25; Waltham, near Canterbury, viii. 07; Crundale, Wye, 14 viii. 15; Chartham, near Canterbury, 17 vi. 09; Kingston-on-Thames, 14 vi. 94; Cambridge, 20 vi. 97; Oxford, 11 viii. 05; Battle; Fowey, 28 vi. 12 (F.V.T.); Germany (Koch, Kaltenbach); Brussels (Schouteden); Italy (Passerini, Ferrari); Odessa (Haviland); America (Patch, Gillette, etc.); Johore, Malay (Takahashi); India (Das); Ceylon (Van der Goot); Japan; Formosa (Maki, etc.); Egypt (F.V.T.); Sumatra; Java (V. d. Goot).

*Observations.* A marked dark species which clusters on the leaves, shoots and pods of the Laburnum and Genista and Broom and often occurs in vast numbers on the Laburnum often destroying the foliage and distorting the seed pods. It is common on Broom in May and June and found on both Laburnum and Broom in August. The alatae fly from the two latter to various *Leguminosæ*, where it often occurs in vast numbers, especially on *Medicago* and was described by Koch as a distinct species in Europe as *medicaginis* and by myself from Egypt as *leguminosæ*. It has also been confused with true *genistæ* and with *rumicis*, from both of which it can be told by the fewer sensoria on iii. of the alate ♀ and the much longer cornicles than occur in *genistæ*. It seems to be widely distributed over the globe. Das refers to it in Lahore as *medicaginis* but I am not sure of his determination for he says

the apterous female is warm red-brown and the adults shine like glass beads amongst the droves of dull coloured young. The Indigo Aphis (Ind. Mus. Notes, VI., 47) is evidently this species. Van der Goot (in Das) proposes the name *papilionacce arum* (p. 204) on the assumption that Koch's *medicaginis* is *rumicis*.

# APHIS OXALINA Theobald.

Ent. Mo. Mag., LXI., 78 (1925).

*Alate viviparous female.* Very dark green with black markings; head dark; pronotum olive-green, rest of thorax black; the deep green abdomen has irregular black transverse broken bars and lateral spots. Antennæ black, base of segment iii. olive, much shorter than body; segment i. wider than ii.; iii. a little longer than iv., with 5 to 7 round sensoria; iv. a little longer than v., with now and then one sensorium; vi. with short flagellum, which is rather more than twice length of base. Rostrum reaches to about base of second coxæ. Cornicles cylindrical, but in some slightly expanding towards base and apex; very imbricated; shorter than segment iii. of antennæ. Cauda about as long as cornicles, constricted towards base, 3 hairs one side, 4 the other and 1 sub-apical. Femora and tibiæ with hairs. Wings normal.

Length 2 to 2.2 mm.

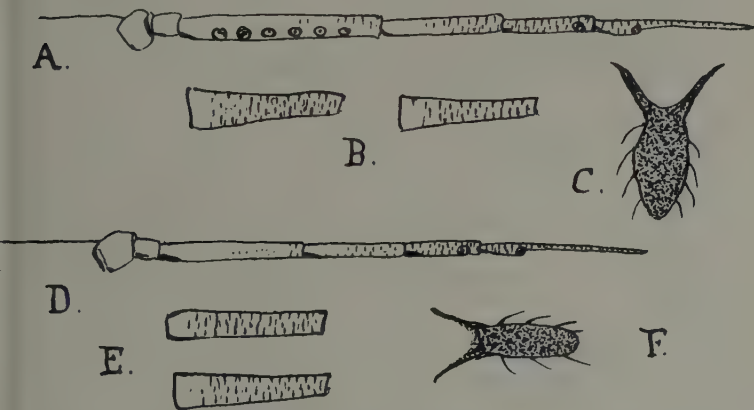


Fig. 51.—*Aphis oxalina* Theobald.

A. B. and C. Alate ♀ antenna, cornicles and cauda; D.E.F. the same of apterous ♀.

*Apterous viviparous females.* Black, very similar in appearance to *rumicis*; antennæ yellow, base and apex black; legs yellow; apices of femora and tibiæ and the tarsi black. Eyes red-black. In some the body is deep blackish-green, with a large dark dorsal patch. Antennæ about half-length of body; segment i. much wider than ii., both black; iii. longer than iv.; iv. and v. about equal; vi. with short flagellum about twice as long as basal area. Rostrum rather short, reaching to second coxæ. Cornicles cylindrical, about as long as antennal segment iii., strongly imbricated. Cauda long, nearly as long as cornicles, 3 hairs one side, 4 the other and 1 dorso-apical. Legs with hairs on femora and tibiæ. Cuticle reticulate, especially on dark dorsal area of abdomen, a line of distinct wax glands each side.

*Length* 2 mm.

FOOD PLANT. The Procumbent Oxalis (*Oxalis corniculatus*).

LOCALITY. Pwllheli, 16 vi. 24 (C. L. Walton).

*Observations.* This species looks very like *A. rumicis*, but can be demarked at once by the cauda having only 3 and 4 lateral hairs and one dorso-apical, not a number of apically curved ones, by the longer cauda and by the much fewer and larger sensoria on antennal segment iii. in the alate female. Macchiati (Fauna e Flora d'Afridi Calabria, 255, 1879) described an *Aphis oxalis* from *Oxalis corniculatus*, but there are very marked differences from the intense green in the apteræ and in the relative lengths of the cornicles and cauda in both alatae and apteræ.

#### APHIS GENISTÆ Scopoli.

Scopoli, Ent. Carn., 139, 409 (1763); Fonscolombe, Ann. Soc. Ent. Fr., X., 103 (1841); Kaltenbach, Mono. Pflanz., 90, 66 (1843); Macchiati, Bull. Soc. Ent. Ital., XV., 240 (1883); Koch, Die Pflanz, 82, figs. 109, 110 (1854); Schouteden, Mém. Soc. Ent. Belg., XII., 221, 21 (1906); Hall, Aphid. Egypt, 17 (1926); non Theobald, Bull. Soc. Roy. Ent. Egypt, VII., 47 (1922).

*Apterous viviparous female.* Black, shiny, with a bluish-white meal; cauda and cornicles black; legs black, except base of femora and a large area on tibiæ; antennæ black at base and apex, median area pale. Antennæ shorter than body; i. wider but no



longer than ii. ; iii. longer than iv., a little shorter than vi. ; iv. and v. about equal ; vi. with basal area more than half of v. ; flagellum a little more than twice as long as base. The cornicles are short and rather thick, about equal to the fourth antennal segment, cylindrical, imbricate. Cauda as long as or longer than the cornicles, thick, blunt, with four pairs of lateral hairs and an apical one curved ; spiny. Rostrum greenish, apex dark, reaching to second coxæ. Eyes deep reddish-brown.

*Length* 1 to 1.4 mm.

*Alate viviparous female.* Shiny black ; cornicles and cauda black ; legs black, base of femora and most of tibiæ yellowish-green. Antennæ shorter than body ; black at base and apex, middle somewhat paler, base of iii. pale yellow. Cornicles short and thick. Cauda about as long as cornicles, thicker and blunt.

*Length* 1.2 to 1.6 mm.

FOOD PLANTS. *Genista tinctoria* and *G. angelica*.

LOCALITIES. Windermere, viii. 15 (Rymer Roberts) ; Germany (Koch) ; Belgium (Schouteden) ; Egypt (Hall).

*Observations.* This appears to be a scarce species in this country. I have only seen apteræ in any number, a colony having been sent me from Windermere by Mr. Rymer Roberts from *Genista tinctoria* and one damaged alate female with no antennæ. It can at once be told from the other black Aphis by the very short cornicles and large cauda and thus cannot be confused with the long cornicled *viburni*, to which it bears a superficial resemblance. Buckton gives it as a synonym of *Aphis rumicis*, but it is certainly not that species. The insects I recorded as *genistæ* from *Genista* in Egypt are not that species but *laburni*. Walker considered *genistæ* to be the same as *laburni* (Zool., 28, 1,999, 1870).

APHIS SEDI Kaltenbach.

Kaltenbach, Mono. Pflanz., 63, 41 (1843) ; Koch, Die Pflanz., 133, 60, figs. 179-181 (1857) ; Walker, Zool., 28, 1,997 (1870) ; Buckton, Mono. Brit. Aphid., II., 90, pl. lxvi., figs. 1 and 2 (1877) ; Schouteden, Mem. Soc. Ent. Belg., XII., 228 (1906) ; Theobald, Entomo., 48, 182 (1915).

*Alate viviparous female.* Thorax deep blackish, shiny; head deep yellowish-green; abdomen dark green. Eyes brown. Antennæ deep brown, about as long as body to somewhat shorter; paler at base of third and fourth segments. Legs yellow, apices of femora and tibiæ and all the tarsi dark. Cornicles black, rather short. Rostrum yellow, apex dark, reaching to third coxæ. Caudal plate black. Wings longish, cubital cell small; insertions yellowish, stigma brownish; costal and sub-costal yellowish; other veins pale brown. Segment i. of antennæ larger than ii.; iii. a little longer than iv., with 5 to 8 round sensoria over its whole length; iv. longer than v.; vi. with basal area less than half v. and about one-fifth length of flagellum. Cornicles cylindrical, about as long as antennal segment v. and nearly twice as wide. Cauda spinose, about to a little more than half length of cornicles.

*Length* 1.7 mm.

*Apterous viviparous female.* Varying from blackish-green to deep green. Antennæ and legs pale. Cornicles rather short and black. Cauda blackish or dusky green, broader and shorter than cornicles. Anal plate black. Antennæ shorter than body; apices of segment iii. and iv. dark; v. and vi. blackish; segment i. larger than ii.; iii., iv. and v. nearly equal, iii. slightly longest; base of vi. equal to v.; flagellum a little more than twice as long. Rostrum yellowish-green, reaching to or past third coxæ, apex black. Cornicles broadened at base, imbricated. Cauda rather long, nearly as long as cornicles, two long hairs each side. Anal plate rounded, hairs longish. In some specimens there are dark median and lateral areas. Legs yellowish-white to pale green; apex of femora, tibiæ and the tarsi dark.

*Length* 1.5 to 1.7 mm.

FOOD PLANTS. Stone crops (*Sedum album*, *S. maximum*, *S. reflexum*, *S. telephium*, etc.).

LOCALITIES. Littlestone, 7 viii. 13; Wye, 17 viii. 14 (F.V.T.); Midhurst (Laing); Haslemere (Buckton); Southgate, 26 viii. 47 (Walker); Brussels (Schouteden).

*Observations.* I have only found this species twice and then only in very small numbers. It is subject to some variation in colour; some apteræ are very dark, looking almost black when

on the plants, others are green. Koch figures one of the latter with pale cornicles; this last I have not yet observed. Kaltenbach found his specimens in August and September; Koch in July. The young both of the dark and paler forms are olive-green to bright green.

# *APHIS PLANTAGINIS* Schrank.

Schrank, Fn. Boica, II., 106, 1185 (1801); Amyot, Ann. Soc. Ent. Fr., 2 Se. V., 478 (1843); Kaltenbach, Mono. Pflanz., 59 (1843); Walker, List. Homop., IV., 1001 (1852); Koch, Die Pflanz., 102, fig. 137 (1854); Passerini, Aphid. Ital., 31 and 40 (1863); Ferrari, Aphid. Ligur., 66 (1872); Kaltenbach, Die Pflanz., 501 (1874); Macchiati, Bull. Soc. Ent. Ital., XV., 256 (1883); Schouteden, Mem. Soc. Ent. Belg., XII., 225 (1906); Donisthorpe, Ent. Rec., 6 (1907); Theobald, Ent. Rec., 50 (1913); Gmelin, Ed. Syst. Nat., I., 2,209, 63 (1788).

*Apterous viviparous female.* Rich deep green, with a dusky tinge; in mature specimens mottled owing to the contained young; more or less oval. Cornicles and anal plate black, also cauda and eyes. Legs yellowish-green, coxæ dark, also apices of femora and tibiæ; tarsi dark. Antennæ shorter than body, of 6 segments;

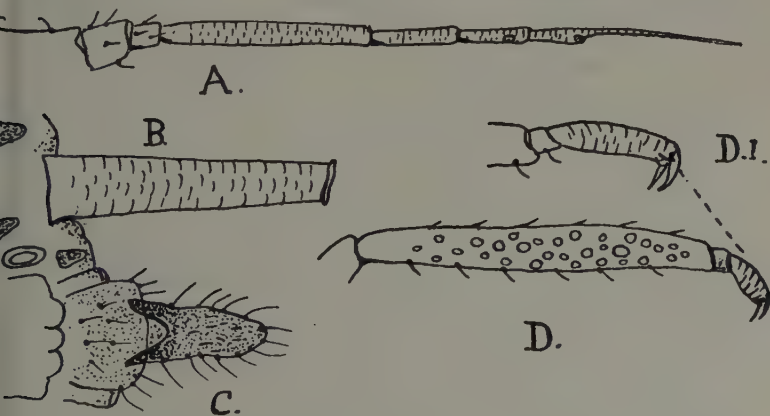


Fig. 52.—*Aphis plantaginis* Schrank.

A. Head and antenna of apterous ♀; B. Cornicle; C. Cauda; D. Hind tibia of oviparous ♀; D1. Tarsus further enlarged.

i. and ii. and apex dark ; i. longer and broader than ii. ; iii. longer than iv. by about one-third ; iv. and v. nearly equal ; vi. longer than iii., basal area about two-third length of iv. ; the flagellum as long as iii. ; a few hairs on all the segments. A marked papilla each side of pronotum. Abdomen with 4 papillæ each side, before the cornicles. A round black spot on each side of the anal plate.

*Alate viviparous female.* Head, thorax and antennæ almost black. Abdomen green, with 3 large and 1 small black lateral spots ; 3 marked lateral abdominal papillæ before the cornicles arising from three large black lateral spots and one between the cornicles and cauda. Antennal segments i. and ii. equal in length, i. broadest ; iii. long, with 7 to 9 round sensoria ; iv. a little longer than v. ; vi. with basal area less than half length of flagellum. Legs green, except apices of tibiæ and the tarsi of the

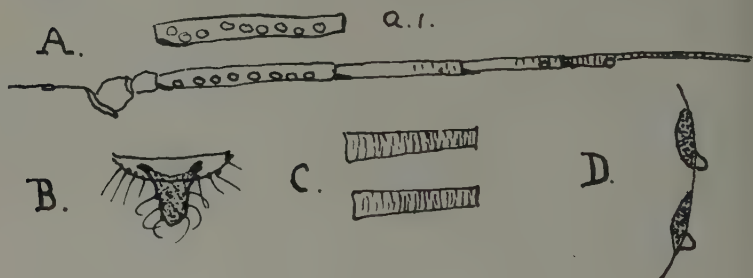


Fig. 53.—*Aphis plantaginis* Schrank.  
A. Alate ♀, Head and antenna ; B. Cauda ; C. Cornicles ; D. Lateral papillæ.

pro- and meso-thoracic legs ; most of femora of hind legs dark, also apices of tibiæ and the tarsi. Rostrum passes third coxæ, apex broad and dusky. Thorax and, in some the green abdomen, shiny. Cornicles black or deep brown, slightly expanded basally. Cauda black, paler at base, about half length of cornicles.

*Length* 1.7 to 1.9 mm.

*Oviparous female.* Apterous. Greenish ; legs with femora and apical third of tibiæ of fore and mid pairs dark ; hind legs all dusky ; tibiæ broadly expanded, narrowed near apices, with

many sensoria ; a few hairs on tibiæ. Antennæ of 5 segments, shorter than body, two last segments dusky ; i. broader than but much same length as ii. ; iii. long, nearly as long as iv. + v. ; iv. about half of iii. ; v. with thin flagellum, rather more than twice as long as basal area. The tibiæ show a marked blunt process at apices, projecting from one side ; third pair swollen, with many sensoria on basal two-thirds. Cornicles dark and short, about same length as cauda, dark. Anal plate dark.

*Length* 1.2 mm.

FOOD PLANTS. *Plantago* spp. ; *Daucus carota* ; *Viola* sp. ; *Chrysanthemum leucanthemum* ; *Rumex* spp. ; *Bellis perennis* ; *Achillea millefolium* ; *A. ptarmica* ; *Leontodon taraxacum* ; Carnations ; *Lychnis diurna*.

LOCALITIES. Fowey and Truro, 17-19 v. 11 ; Worcester, vi. 13 (F.V.T.) ; Bradgate Park, Leicestershire, 3 v. 09 (Donisthorpe) ; Kew Gardens, 24 xi. 10 ; Weybridge, 1 x. 10 ; Portmadoc, Wales, v. 01 ; Kingston-on-Thames, 7 vi. 84 ; Cambridge, 17 v. 88 ; Maidstone, 7 ix. 15 ; Wye, 2 x. 15 (F.V.T.) ; Rothamsted ; Sheerness, 3 ix. 15 (Fryer) ; Wan Fell, Cumberland, 22 ix. 12 (Britten) ; Rossbeigh, Co. Kerry, Ireland, vi. 02 (Donisthorpe) ; Belgium (Schouteden) ; Stazzano, Liguria (Ferrari) ; Calais, 7 vii. 11 (F.V.T.) ; Germany (Kaltenbach).

*Observations.* This Aphis is usually found in May, June, July, September and October. It is most noticeable in May and June and in October. It first occurs on the blossom stalks and then on the lower leaves of the Plantains, Dandelions, etc., and again is to be found there in autumn. It collects under the leaves, especially on or near the ground. It has also been recorded in the umbels of *Daucus carota*. At other times it occurs on the roots of various plants, such as *Bellis*, *Chrysanthemum*, *Achillea*, *Rumex*, *Plantago* and Carnations. Beneath the leaves and also on the leaf stalks they produce their young and now and then alate broods. Ants are particularly attracted to them and cover the leaves where the Aphides live with soil and so bury them. At the same time ants remove the Plant Lice and take them into their nests, where they reproduce on the roots of various plants. The oviparous female recorded here was found in an ant's nest and many ova have been found. The ants' nests in which this

insect has been found are those of *Lasius niger*, *L. flavus*, *Formica rufa* (Donisthorpe); *F. fusca* (Britten) and *Myrmica ruginodis* (Donisthorpe). In 1915 I received in late September large colonies from Mr. E. Bunyard from near Maidstone on the leaf stalks of *Plantago major*. Later these all went down to the roots and on September 30th many alatae appeared. Ants were in attendance, both above and below ground. The colonies sent me by Mr. Fryer were feeding on Carnation roots and on the necks of the plants, as well as just above ground. Many nymphæ occurred amongst them and they were all markedly smaller than the apteræ. Baker and Turner (Journ. Agri. Res., VII., 324, pl. 24, A. 1916) consider this distinct from *roseus*. The species I take to be *plantaginis* does not come in the genus *Anuraphis*.

#### APHIS SYMPHITI Schrank.

Schrank, Fn. Boica, II., 107 (1801); Kaltenbach, Mono. Pflanz., 61, 43 (1843); Koch, Die Pflanz., 72, 16, figs. 93, 94 (1854); Walker, Ann. Mag. Nat. Hist., Se. 2, 25, 74 (1850); List Homop. (B.M.), IV., 893 (1852); Macchiati, 257 (1883); Schouteden, Mem. Soc. Ent. Belg., XII., 228, 63 (1906); Theobald, Entomo. 48, 258 (1915); Del Guercio, Redia, XII., 241, pl. iv., figs. 59-62 (1917).

*Alate viviparous female.* Green; head and thorax black and shiny; the shiny green abdomen with a dark green to black patch behind and black lateral spots. Antennæ deep brown. Cornicles black. Cauda yellowish-green to deep olive-green. Legs yellowish-green to deep green, apices of femora, tibiæ and the tarsi black. Eyes brown. Rostrum yellow, apex black. Antennæ as long as to a little less than the length of the body: segment i. larger than ii.; iii. a little longer than iv., with 7 to 9 round sensoria on one side; iv. about the same length as the v., with 1 to 2 sensoria; v. with 1 to 2 sensoria + the normal subapical one; base of vi. about half v.; flagellum three times as long as the base. Rostrum reaches to second coxæ. Cornicles moderately long and thick, cylindrical, about as long as antennal segment iv., markedly imbricated, giving a striate appearance. Cauda about three-quarter length of cornicles, well constricted in middle, finely spinose, with three pairs of lateral hairs. Legs moderately long, the tibiæ with numerous hairs.

*Length* 1.5 to 1.7 mm.



*Apterous viviparous female.* Dull green, with greyish blue meal, the head, bands on the thorax, large area on abdomen deep olive-green to deep brown, bands on thorax, posterior part of body, sides and venter yellowish. Antennæ yellow, base and apex and tips of segments brown. Cornicles black. Cauda yellowish-green. Legs yellow, apices of femora, tibiæ and the tarsi dark brown. Antennæ shorter than body, thin; segment i. wider than ii.; iii. a little longer than iv.; iv. equal to v.; base of vi. one-half v.; flagellum three times as long as base; iii. to vi. markedly imbricated. Rostrum reaches to third coxæ. Cornicles rather thick and cylindrical, tapering to some extent apically, markedly imbricated and about equal in length to antennal segment iii. Cauda more than half length of cornicles, some specimens less so, three long curved hairs each side; finely spinose. Segmentation of the body distinct. A few hairs on the body.

Length 1.9 to 2 mm.

FOOD PLANTS. *Symphitum officinale*; *Achillea millefolium*; *Anchusa italica*; *Arctium lappa*; *Capsella bursa-pastoris*; *Carduus acanthoides*; *C. crispus*; *C. nutans*; *Cirsium lanceolatum*; *Citrullus vulgaris*; *Cucurbita clypeiformis*; *C. maxima*; *C. peplo*; *Echinaspermum lappula*; *Echium vulgare*; *Galeopsis ladanum*; *Myosotis palustris*; *M. sylvatica*; *Onopordon acanthium*; *Stachys recta*.

LOCALITIES. Wye, 7 ix. 01 (F.V.T.); Claygate, Surrey (Laing); Tottenham, 19 ix. 47 (Walker).

*Observations.* The alate females described here are in Walker's collection in the National Museum of Ireland, as I have not found any alatae myself. The list of food plants is taken from Wilson and Vickery's List of Aphididæ of the World, with the exception of the Comfrey *Symphitum officinale*, the only food plant upon which it has been found in Great Britain as far as I know. Mr. Laing found it rarely on *Symphitum*, but knows of no other food plant.

APHIS POMI De Geer.

*Aphis mali* Fabricius (non Oestlund; etc.).

*Aphis oxyacanthæ* Schrank (non Koch).

*Aphis padi* Sanderson (non Linnæus).

*Aphis pyri* Kittel (non Boyer, Koch, etc.).

*Aphis cratægaria* Buckton (non Walk).

De Geer, Mem., III., 53, pl. III., figs. 18-21 (1773) ; Fabricius, Syst. Ent. 737 (*pyri-mali*), (1794) ; Ent. Syst., 216 (*pomi*), (1794) ; Schrank, Fn. Boica, II., 115 (*mali*) ; 115 (*oxyacanthæ*), 1801 ; Kaltenbach, Mono. Pflanz., 72 (1843) ; Koch, Die Pflanz., 107, pl. XX., figs. 143, 144 (1857) ; Passerini, Gli Afidi, 34 (1860) ; Aphid. Ital., 163, fig. 11 (1863) ; Walker, Ann. Mag. Nat. Hist., Se. 2, II., 269 (1848) ; Zoologist, VI., 2251 (1848) ; List. Homop. (B.M.), 905 (1852) ; Ferrari, Aphid. Lig. Ann. d. Mus. Cir. Stor. Nat. Genova, II., 68 (1872) ; Macchiati, Bull. Soc. Ent. Ital., 255, N. 82 (*mali*), (1879) ; Buckton, Mono. Brit. Aphid., II., 44, pl. I. (part) (1879) ; Taschenberg, Prakt. Ins. Kunde, pt. V., 53 (1880) ; Cowen, Bull., 31, Colo. Agri. Exp. Sta., 120 (1895) ; Fletcher, Rept. Ento. and Bot. Canada, 1895, 147-163 (1896) ; Ormerod, Handbk. Ins. Orchard and Bush Fruits, 6 (*mali*, etc.) (1898) ; Smith, Bull. 143, N. Jersey Agri. Exp. Sta., 23 (1900) ; Forbes, Circ., 36, Ill. Agri. Exp. Sta., 32 (1901) ; Leonardi, Gli. Insetti Novici, III., 221 (1901) ; Sanderson, Trans. Penn. Hort. Soc., pt. II., 45 (1901) and 12th Rept. Del. Coll. Agri. Exp. Sta., 191, fig. 10 (*pudi*) (1901) and 13th Rept., 130 (1902) ; Gillette, Bull. 31, U.S. Dep. Agri. (Div. Ent.), 53 (1902) ; Tullgren, Upp. Prak. Ent., XIII., 79 (*mali* Koch) (1903) ; Schouteden, Ann. Soc. Ent. Belg., XLVII., 173 (1903) and Marcellia Avellino, II., 93 (1903) ; Theobald, 1st Rept. Eco. Zool. (B.M.), 27 (1903) ; Tavares, Broteria Lisboa, II., 165, no. 16 (1903) ; Sanders, Rept. Ento. and Bot., 1903 : Sess. Pap. 16, 193 (1904) ; Marchal and Chateau, Autun. Mem. Soc. Hist. Nat., XVIII., 273 (1905) ; Carpenter, Eco. Proc. Roy. Soc., Dublin, I., pt. 4, 301 (1905) ; Dewar, Farmers Bull., VIII., 12, Orange River Colony (1905) ; Tavares, Broteria Lisboa, IV., 12 (1905) ; Sanderson, Bull. 74, Del. Coll. Agri. Exp. Sta., 130-136, figs. 11-14 (1906) ; Theobald, Rept. Eco. Zool., 1907, 38 (1907) ; Quaintance, Circ. 81, Bur. Ent. U.S. Dep. Agri. (1907) ; Grevillius und Niessen, Coeln. Arbeiten der Rheinischen Bauern-vereins, fas. III., No. 60 (1908) ; Theobald, Ins. and Allied Pests of Fruit, 133 (1908) ; Gillette and Taylor, Bull. 133, Colo. Agri. Exp. Sta., 23 (1908) ; and Bull., 134, 11 (1908) ; Gillette, Journ. Eco. Ent., I., 303, pl. V., figs. 1-8 (1908) ; Lea, Ins. and Fungi Pests of Orchard and Farm, Tasmania, 64 (1908) ; Theobald, Rept. Eco. Zool., 1908, 50 (1909) ; Carpenter, Eco. Proc. Roy. Soc., Dublin, II., pt. 2, 12 (1910) ; Theobald, Rept. Eco. Zool., 1910, 35 (1911) ; idem 1911,

34 (1912) ; Tullgren, Upp. Prak. Ent., XXII., 67 (*pomi*) (1913) ; Carpenter, Eco. Proc. Roy. Soc., Dublin, II., No. 6 (*pomi* and *sorbi*) (1913) ; Theobald, Bull. Ent. Res., IV., 323 (1914) ; Patch, Bull., 233, Maine Agri. Exp. Sta., 267 (1914) ; Theobald, Canad. Ent., XLVIII., 173 (1916) ; Baker and Turner, Journ. Agri. Res., XV., 955-993 (1916) ; Matsumura, Journ. Coll. Agri. Sapporo, VII., 367 (1917) ; Essig and Kuwana, Proc. Calif. Acad. Sc., 4 Se., VIII., 734 (1918) ; Swain, Univ. Calif. Pub., III., 120 (1919) ; Matheson, Cornell Agri. Exp. Sta. Mem., 24, 683 (1919) ; Takahashi, Aphid. Formosa, pl. I., 48 (1921), pt. II., 103 (1923) ; Glendenning, Proc. Soc. Ent. Brit. Columbia, No. 21, 41 (1924).

*Alate viviparous female.* Head and thorax black ; abdomen green ; cornicles black, straight, imbricate ; antennæ shorter than body ; segment iii. with 6 to 10 sensoria ; iv. with 2 to 4 sensoria ; iii. longer than iv. ; iv. longer than v. Cauda black, blunt, with 4 to 5 pairs of lateral hairs. Four pairs of black lateral spots on abdomen, from each arises a blunt papilla and another is present on the segment carrying the cornicles, smaller than the preceding, but marked ; segments vii. and viii. may have blackish median basal patches. Legs green, apices of femora and tibiae and the tarsi dark. Wings with yellowish-green insertions.

*Length* 2.0 to 2.5 mm.

*Apterous viviparous female.* Bright green to rich yellow green ; cornicles markedly black, slightly tapering, thick and rather long.

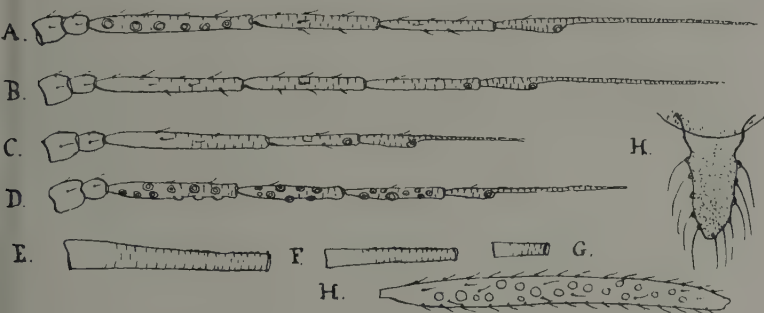


Fig. 54.—*Aphis pomi* De Geer.

A. Antennæ of alate ♀ ; B. of apterous ♀ ; C. of Stem Mother ; D. of male ; E. Cornicle of B. ; F. of A. ; G. of C. ; H. Cauda of apterous ♀ ; and hind tibia of oviparous ♀.

Cauda blackish to deep brown. Antennæ not quite so long as body; segment iii. longer than iv.; iv. very slightly longer than v. Legs green; apices of femora and tibiæ and tarsi black.

*Length* 1.5 to 2 mm.

*Oviparous female.* Apterous, Green to dull yellow, often mottled; head brownish. Cornicles black, straight, imbricate. Cauda black. Antennæ not so long as body, of 6 segments; i. larger than ii.; iii., iv. and v. nearly equal; vi. about as long as iv. + v.; v. and vi. dark, also i. and ii.; remainder green; the junction of iii. and iv. often indistinct. Eyes large, dark.

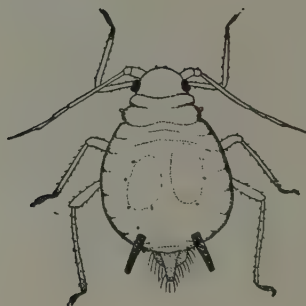


Fig. 55.—*Aphis pomi* De Geer.  
Oviparous female.

Rostrum reaches past second coxæ. Pronotum with a large green papilla on each side. Abdomen with one large papilla and 3 smaller ones each side; sometimes yellowish laterally; also with a few hairs. Cornicles thick, black, cylindrical, slightly expanding basally; imbricate; longer than segment iii. of antennæ. Cauda prominent, dark, with 5 to 6 pairs of lateral hairs and a median dorso-apical one, all curved apically. Anal plate dark. Legs with dark femora except just at their base; tibiæ pale, apices dark; tarsi dark; hind tibiæ with a few sensoria (2 to 18); genitalia dark.

*Length* 1 to 1.5 mm.

*Male.* Apterous; dull yellowish-brown, yellowish-green to green. Antennæ of 6 segments, not quite so long to slightly longer

than body ; segment i. wider than ii., but not so long ; iii. as long as iv. ; iv. slightly longer or same length as v. ; vi. about as long as iv. + v., in a few I have noticed a single sensorium on iv. Eyes



Fig. 56.

Colony of *Aphis pomi* De Geer on Quince, showing the slight leaf damage.

large, black. Cornicles black, cylindrical, slightly expanding at base, not quite so long as antennal segment iii. Femora and tibiae dull green to deep brown, except apices of latter ; tarsi dark. Cauda black, with several long lateral hairs, bent at their tips. Genitalia black. Penis yellowish.

*Length* .8 to 1.0 mm.

FOOD PLANTS. Apple ; Pear ; *Cotoneaster vulgaris* ; *Cydonia* spp. ; *Mespilus germanica* ; *Crataegus oxycantha*. It has also been recorded on *Pyrus serotina* ; *Glochidium* sp. (in Japan and Formosa) ; *Sorbus aucuparia*, *S. domesticus*, and *S. torminalis*. Macchiati gives *Mespilus japonica* and *Ailanthus glandulosa* (p. 255).

**LOCALITIES.** All over Great Britain and Europe generally. America, British Columbia (Glendenning), South Africa, Egypt, North Africa, Tasmania. Lounsbury found the ova on imported stock in South Africa ; New Zealand and Bermuda (F. Laing) ; Tokyo, Japan ; Taihoku, Formosa (Takahashi).

**Observations.** The Green Apple Aphis occurs every year on Apple, Pears and Quince in this country, often in great numbers. The damage done by it is not nearly so severe as that done by *Anuraphis roseus*. It mainly lives on the top shoots and beneath the leaves, often close together, often in groups. The leaf curling is not nearly so severe as in attacks of *Anuraphis roseus*. The eggs of *pomi* hatch out from early April to early May. This species increases very slowly at first, but by late June it may spread rapidly and on into July. The earliest alate females I have found were at the end of June and they continue to appear erratically on to September. Sexual forms commence to appear in



Fig. 57.  
Ova of *Aphis pomi* on Quince.

October and may be found to almost the end of November. Both apterous males and oviparous females swarm under the leaves, where copulation usually takes place. The fertile females crawl on to the shoots where they deposit their eggs, usually great numbers together. The ova at first dull yellow to yellow-green become black and shiny in a few days. There they remain all the winter. The whole cycle may be passed on the Apple, Pear, Quince or Hawthorn. Miss Patch finds the same happens in America.



Whilst in America it is very harmful, it is not usually so in Great Britain except on nursery stock. The hind tibiae of the egg-laying female are not much swollen, and carry but very few sensoria; in fact in some I have failed to detect any at all.

*APHIS NASTURTII* Kaltenbach.

Kaltenbach, Mono. Pflanz., 76, 54 (1843); Walker, Ann. Mag. Nat. Hist., Se. 2, VI., 119 (1850); Koch, Mono. Pflanz., 136, figs, 1814, 185 (1854); Schouteden, Mem. Soc. Ent. Belg., XII., 224 (1906); Del Guercio, Redia, VII., 319 (1911); Das, Aphid. Lahore, Ind. Mus. Mem., VI., 220 (1918); Takahashi, Aphid. Formosa, II., 107 (1923).

*Alate viviparous female.* Head deep brown. Thorax deep brown, lobes shiny black. Abdomen green, with black (3 to 4) lateral spots. Antennae deep brown to deep olive green. Cauda and anal plate deep brown. Cornicles deep brown to deep olive-green. Rostrum green to almost yellow, apex black. Eyes deep reddish-brown. Legs yellowish-green; apices of femora and tibiae black; tarsi black. Wing veins yellowish-green; stigma

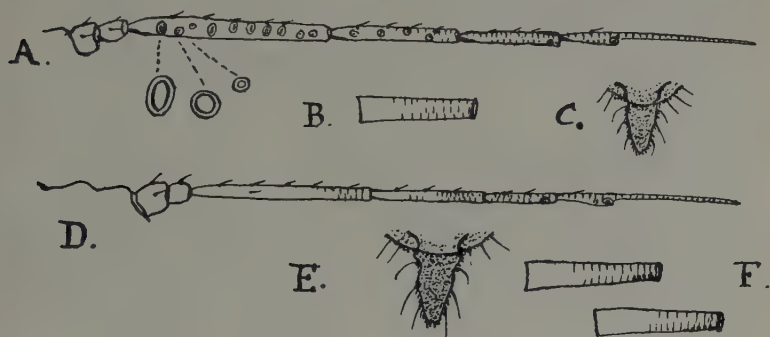


Fig. 58.—*Aphis nasturtii* Kaltenbach.

A.B.C. Antenna, cornicle and cauda of alate ♀; D.E.F. of apterous ♀.

brown. Antennae a little shorter than body; segment i. larger than ii.; iii. longer than iv., but not quite so long as v., with 8 to 12 rather oval sensoria, one or two being smaller than the rest; iv. about as long as v., with 2 to 5 round sensoria; v. about twice as long as basal area of vi.; flagellum only a little longer than iv. Cornicles cylindrical, nearly as long as antennal segment

iv., rather thick; imbricated. Cauda prominent, about two-thirds length of cornicles, 3 hairs each side. Anal plate spinose, with several long hairs, rather small, rounded apically. Rostrum reaches second coxæ.

*Length* 2 to 2.3 mm.

*Apterous viviparous female.* Green, somewhat swollen; antennæ green, except for brown apices or brown, with greater part of iii. and base green. Cornicles green, apices dusky, some slightly darkened. Cauda and anal plate green. Legs green to yellow-green; tarsi dark. Antennæ shorter than body; segment i. much wider but no longer than ii.; iii. longer than iv. and about same length as vi.; iv. longer than v.; basal area of vi. about two-thirds of iv. and half length of flagellum. Cornicles cylindrical, slightly swelling at base, a little shorter but wider than antennal segment iii.; imbricate. Cauda prominent, about two-third of cornicles, wide, bluntly acuminate, 3 hairs each side. Legs moderately long; tibiæ and apices of femora with hairs. Rostrum reaches to nearly second coxæ.

*Length* 1.8 to 2.2 mm.

FOOD PLANTS. *Nasturtium sylvestris*; *N. amphibium*; *N. palustre*; *Periploca gracoa*; *Radicula nasturtium*; *Sisymbrium officinale*. *Stellaria aquatica* and *S. uliginosa* (in Formosa).

LOCALITIES. Wye, 20 viii. 11; Guildford, 25 vii. 12; Lymington, 14 vii. 15 (F.V.T.); various parts of Middlesex and Bucks. (F. Laing); Southgate, 7 vi. and 13 viii. 47 (Walker); Lahore, India (Das); Formosa (Takahashi).

*Observations.* Common where found on Watercress and other allied plants. The flagellum of vi. is rather shorter than usual in *Aphis*. The alatae appear at the end of June and in July. It occurs on the stalks and leaves, right down to the water on cultivated Watercress. I have seen it in some beds in Surrey doing much harm, when the beds have been neglected. It is of common occurrence on *Nasturtium officinale* in dykes. Das found it on *Nasturtium* sp. in moist places along the margin of ditches and water courses.

## APHIS GOSSYPHII Glover.

- Aphis malvæ* Koch.  
*Aphis cucumeris* Forbes.  
*Aphis citrulli* Ashmead.  
*Aphis cucurbiti* Buckton.  
*Aphis tectonæ* V. d. Goot.  
*Aphis malvoides* Das.  
*Aphis malvearum* V. d. Goot.  
*Aphis shiraki* Takahashi.  
*Toxoptera leonuri* Takahashi.  
*Aphis parvus* Theobald.  
*Aphis bauhiniae* Theobald.

Glover, Patent Office Rept., 62 (1854) and 68 (1855); Rept. Agri. U.S.A., 36 (1876); Ashmead, Florida Dispatch, I., 241 (1882); Forbes, 12th Rept. Nox and Ben. Ins., Illinois, 83-91 (1883); Buckton, Mono. Brit. Aph., II., 56, pl. LIV., figs. 1 and 2 (1879); Pergande, Insect Life, VII., 309-315 (1895); Lugger, Bull. 69, Ent. Div. Agri. Exp. Sta. Univ. Minnesota, 196-198, figs. 157 (1900); Gahan, Bull. 119, Maryland Agri. Exp. Sta. 18 (1907); Theobald, Sec. Rept. Wellcome Labs. Khartoum, 93 (1906); Lounsbury, Agri. Journ., Cape Colony, Oct. (1908); Koch, Die Pflanz., 125, figs. 169-170 (1855); Vassiliev, Trd. b. entom. učn. Kom. Gl. Upr. Zeml. Petrograd, VIII., 6, 1-24, figs. 1-8 (1910); Theobald, Bull. Ent. Res., IV., 321, fig. 5 (1914); idem VI., 153 (1915); V. d. Goot, Fn. Ind. Neerland, 1, 3, 111 (1917); Das, Aphid. Lahore, Mem. Ind. Mus., IV., 219 (1918); Walker, List. Homop. (B.M.), pt. IV., 968 (1852); Buckton, Mono. Brit. Aphid., II., 42, pl. XLIX., figs. 1 and 2 (1879); Essig and Kuwana, Proc. Calif. Acad. Sci., VIII., 68-70 (1918); Takahashi, Spec. Bull. Agri. Exp. Sta., Formosa, I., 58 (1921); Aphid. Formosa, I., 41 (1921); II., 94 (1923); Philipp. Journ. Sci., 24, 6, 712 (1924) and 21, 5, 421 (1922); Hall, Aphid. Egypt, 18 (1926); Theobald, Bull. Ent. Res., VIII., 279 (1918) (= *bauhiniae* Willcocks, Sult. Agri. Soc. Bull., I., 267 (1922); Theobald, Bull. Ent. Res., VI, 127 (1915) (= *parvus*); Willcocks, Sult. Agri. Soc. Bull., I., 338 (1915).

*Alate viviparous female.* Yellow, pale yellowish-green to dark green. Head, pronotum and thorax dark; a pale band

before and behind pronotum. Abdomen with 4 black lateral spots, in some only 3 show, there may also be some dark dorsal spots making 2 or 3 broken transverse bands ; in some forms the base of the abdomen may be orange, especially in dark forms. Antennæ shorter than body, varying from black to yellow, except at base and apex where they are black ; segment i. larger than ii. ; iii. longer than iv. and nearly as long as vi. with 5 to 8 round sensoria in a line ; iv. and v. about equal ; basal area of vi. more than or about half v. ; flagellum about 3 times as long as basal



Fig. 59.—*Aphis gossypii* Glover.  
Alate ♀ and A. Antennal segment iii. further enlarged.

area. Eyes dark, large. Rostrum thin yellow, apex dark, reaching to or just past second coxæ. Cornicles black, cylindrical, in some slightly expanding basally ; imbricate ; about as long as segment iv. of antennæ, but thicker. Cauda green to almost black, from half to rather more the length of the cornicles, several long, fine hairs. Anal plate dark. In some the cauda is almost yellow. Legs rather long and thin ; apices of femora, tibiæ and the tarsi dusky ; in some the femora are all dark except at the base. Wing insertions yellow ; stigma yellow, yellow-green to grey ; veins thin, pale brown or black.

Length 1.2 to 1.9 mm.

*Apterous viviparous female.* Colour variable, yellow, yellow-green, green of various deep shades, a few almost black. Antennæ reaching to or beyond middle of body ; segments i., ii. and vi. and apex of v. dark, rest yellow ; i. wider than ii. ; iii. longer than iv., not so long as vi., which latter seems to vary in length to some

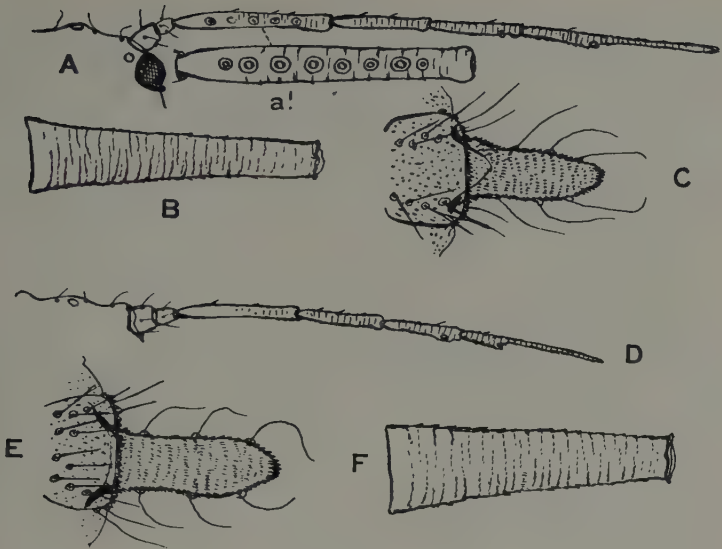


Fig. 60.—*Aphis gossypii* Glover.

A. Head and antenna of alate ♀; a¹. Segment of iii. further enlarged; B. Cornicle; C. Cauda and anal plate; D. Antenna of apterous ♀; E. Cauda and anal plate and F. Cornicle.

extent; iv. a little longer to nearly same length as v.; basal area of vi. more than half v. and about a quarter of flagellum. Eyes black; rostrum yellow; apex dusky in some reaching often to third coxæ. Cornicles black, olive-green or green, as long as or even



Fig. 61.—*Aphis gossypii* Glover.  
Apterous ♀ and A. further enlarged antenna.

longer than antennal segment iii., thick, cylindrical, broadened basally, divergent, imbricate. Cauda greenish to almost black, less than to almost half the cornicles; 3 pale hairs each side, curved apically. Anal plate dark, hairy. A small conical papilla on each side of pronotum, one between cornicles and cauda and smaller ones cephalad. Legs yellow to green; apices of tibiae and the tarsi dark, in some also apices of femora. Whole body now and then more or less mealy.

*Length* 1.5 to 1.9 mm.

**FOOD PLANTS.** Most *Cucurbitaceæ*; Cotton (*Gossypium*); *Solanum* spp.; *Portulaca oleracea*; *Lycospermum*; *Capsella bursa-pastoris*; *Lepidium virginicum*; *Rumex* spp.; *Lappa major*; *Taraxacum dens-leonis*; *Chenopodium album*; *Plantago virginica*; *Stellaria media*; *Convolvulus*; *Acalypha virginica*; *Diodiateres*; *Nepeta glechoma*; *Trifolium pratense*; *Malva rotundifolia*; *Phaseolus nanus*; *Spinacia oleracea*; *Humulus lupulinus*; *Pyrus communis*; *Cornus mas*; *Datura stramonium*; *Cosmia* sp.; *Begonia* sp.; *Hydrangea* sp.; *Hibiscus* spp. and Oats (*Avena fatua*) under glass at Bangor. *Tectona grandis* *Casuarina equisetifolia* and *Melastoma* (Takahashi).

**LOCALITIES.** Sale, Manchester, 7 vii. 13; Boxmoor, 17 x. 13; Aberystwyth, 19 vii. 16; Swanley, viii. 01 (F.V.T.); Carshalton, Surrey, ix. (Buckton); Bangor (Walton). Russia (Vassiliev, etc.); North America generally; Bonito, Mexico (Townsend); Brazil; Montserrat, B.W.I. (Hubbard); Jamaica (F.V.T.); Adelaide, Australia (Kobe); Cape Colony, Transvaal, British East Africa, Uganda, South Nigeria, Kamerum, Sudan and at Cairo. India (Lefroy); Johore, Malay (Takahashi); Amoy, China (Takahashi); Sumatra (Takahashi); Formosa (Takahashi); Kuala Lumpur; Fiji; British Guiana; Cyprus; Barbados; Queensland (F. Laing).

**Observations.** A world wide species and often very harmful to Cotton, Melons, etc., in America and Africa. It is sometimes spoken of as the Melon Aphis, at others as the Cotton Aphis. In Great Britain it is mainly found under glass on Melons and Cucumbers and abnormally on Oats under glass and has been found on them there in the open. The food plants are as varied



as the insect itself. Whilst it appears to be common on Oranges in America, it is uncommon on *Citrus* fruits in Africa.

Das (Aphides, Lahore) separates Koch's *Aphis malvæ* from *A. gossypii* by the spur on antennal segment vi. being much longer than iii., whilst in *gossypii* it is slightly longer or sub-equal to iii. and he says that *gossypii* is a larger species. They as far as I can see, cannot be separated in this way, for one gets all variations in the antennal segments of *gossypii* even in the same colony and size is of no account. Buckton's *Aphis cucurbiti* has black cornicles and is certainly *gossypii*. There is undoubtedly a large and a small form of *gossypii*, but I have been unable to separate them. The flagellum varies in relative length in both and also in the relative length compared with segments iv. and v. In the small forms the spur is often equal to iv. + v., in the large it is usually shorter than iv. + v., but all intermediate stages occur. Das' *Aphis malvoides* is only *A. gossypii* as was suggested by Van der Goot. Takahashi now places his *Toxoptera leonuri* as *gossypii*, for some of the alatae have the vein forked as in *Aphis*. I have never seen any sexuales, but Pergande refers to the eggs having been found (Journ. Eco. Ent., I., 176-181), others, as Gillette, state that no eggs have so far been found.

#### APHIS PARIETARIA Theobald.

Ent. Mo. Mag., LX., 23 (1922).

*Alate viviparous female.* Head and thorax blackish. Abdomen deep green to green, with more or less noticeable dark lateral spots before cornicles. Antennæ a little shorter than body, brown to dusky green. Cornicles dark brown to almost black, short and thick. Cauda dusky green. Legs green, apices of tibiæ and hind femora dark; tarsi dark. Wing veins pale; stigma pale greenish. Venation often as in *Toxoptera*, in others of *Aphis* type. Segment i. of antennæ wider but no longer than ii.; iii. slightly longer than iv., not so long as vi. with 4 to 6 round sensoria; iv. about equal to v.; vi. with basal area about equal to half v.; flagellum three times as long. Eyes large, black. Rostrum green, dark at apex, reaching to third coxæ, or just before or beyond. Cornicles short, thick, dark, about half length of antennal segment iii. Cauda paler than cornicles, nearly as long, finely spinose; 4 hairs each side. Venter of head and sternum black.

*Length* 1.3 to 1.9 mm.

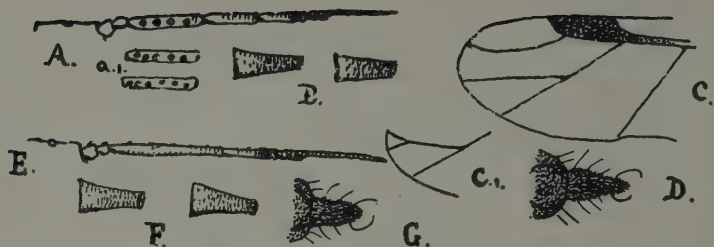


Fig. 62.—*Aphis parietaria* Theobald.

A. Head and antenna of alate ♀; a.i. variations segment iii. of antenna; B. Cornicles; C. and Cr. Apex wing; D. Cauda and anal plate; E. Head and antenna apterous ♀; F. Cornicles; G. Cauda.

*Apterous viviparous female.* Green, pale green, ochreous, dusky yellow or pinkish. Antennæ shorter than body, green to yellow, except apices of segments iv. and v., of 5 segments. Cornicles rather short, thick and dark. Cauda paler, dusky green. Legs same colour as body; tarsi dusky, in some the apices of the tibiæ. Eyes black. Segment i. of antennæ wider but no longer than ii.; iii. long, as long as iv. + v.; basal area of v. more than half iv. and nearly half the flagellum. Rostrum green, in some the apex dusky, reaching to or just past second coxæ. Cornicles dark, short and thick, slightly expanded basally, imbricate; about as long as or a little longer than cauda. Cauda paler than cornicles; 4 hairs each side. A small marked green papilla each side of pronotum and four small ones each side of abdomen before cornicles and one between them and cauda.

*Length* 1 to 1.7 mm.

**FOOD PLANT.** Wall Pellatory (*Parietaria officinalis*).

**LOCALITIES.** Wye, v. to ix. 10-27; Rochester Castle, 7 vii. 14; Corfe Castle, Dorset, 14 vii. 12; Sandwich, 19 viii. 22 (F.V.T.); Llandudno Junction, viii. 25 (Dallman); Llanddwyn, Anglesey, North Wales, viii. 23 (Walton).

**Observations.** I first found this *Aphis* swarming all over the leaves and stems of the Wall Pellatory growing on the Church and Church walls at Wye and it has occurred every year since 1910. It is first noticeable in May and continues until August, when it becomes alate and all seem to fly away. It usually occurs in vast

numbers and the many exuviæ give the plants a curious grey dull hue as the sticky matter holds the exuviæ on. It is probable that the *Aphis urticæ* recorded by some observers on this plant is this species. Lichtenstein lists an *Aphis parietaria* but it was never described. I have used his name. Buckton's record of Schrank's *Aphis scabiosæ* on *Parietaria officinalis* from Pembroke is probably this insect. In fact in 1884 I found the Wall Pellatory on Pembroke Castle covered with Aphis, but the tube became too dried up to be certain of the species.

#### APHIS ACETOSÆ Buckton.\*

Mono. Brit. Aphid., II., 80, pl. LXII., figs. 5-7 (1877).

*Apterous viviparous female.* "Globose or oblong, shiny, dark brown or nearly black. Head broad; eyes reddish-brown; antennæ ochreous with black tips. Abdomen domed, with marginal spines. Legs hairy, bright ochreous, with black femoral tips on third pair; tarsi black. Size of body 2.27 mm × 1.27 mm. Length of antennæ 0.54 mm.; of cornicles 0.50 mm.

*Pupa.* Head broad; abdomen slaty grey, velvet-like, deeply ringed. Wing cases and thorax more or less green.

*Alate viviparous female.* Head and thorax shining black; the latter with two strong spines. Antennæ and legs as in the larva. Abdomen pointed, shining, dark olive-green, with obscure transverse bars, spinose. Cornicles black. Cauda moderately long, olive green. Wings short, pale, iridescent, finely veined with yellow; insertions and stigma grey. Rostrum reaches to third coxæ.

This species has a great resemblance to *A. jacobææ*, but is larger and more shining. The head and thorax of the winged female are much less developed in width and the wing veins are not so coarse and black. Taken in abundance on *Rumex acetosa* from June to September."

#### APHIS IDÆI Van der Goot.

V.d. Goot. Tijds. v. Ent. LV., 78-80, fig. 10 (1912); Dobrowl-jansky, Ent. Sta. d. Landwist. Synd. in Kiew, 33 (1913).

\* If this is a distinct species, it will require a new name. I have not seen Buckton's specimens, and Mr. Laing says he has no specimen.

*Apterous viviparous female.* Bright green, mottled with deeper green. Eyes black. Antennæ pallid, apices dark. Legs green; tips of tibiæ and the tarsi black. Dark cornicles, in some almost black. Cauda green to deep green or olive. Body with few hairs. A small papilla each side of pronotum and on segments i. and vii. of abdomen. Antennæ much shorter than body, with a few short hairs; segment i. larger than ii.; iii. a little longer than iv., about same length as vi.; iv. a little longer than v.; basal area of vi. shorter than v., the flagellum nearly twice as long. Rostrum green, apex dusky, apical segment longer than penultimate, reaching to or just beyond second coxæ. Cornicles long, curved outwards, cylindrical, slightly expanding basally, about as long as antennal segment iii., imbricated. Cauda not quite half length of cornicles, bluntly acuminate, finely spinose, with 3 hairs each side.

Length 2.2 to 2.4 mm.

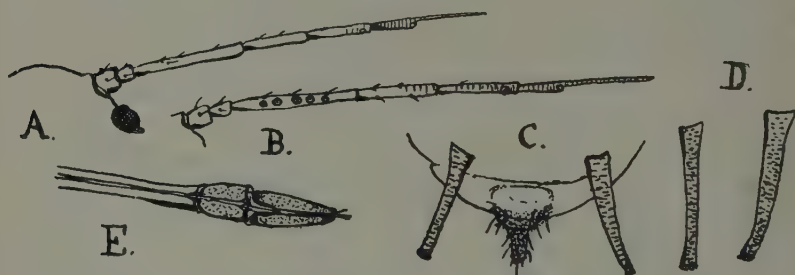


Fig. 63.—*Aphis idæi* V. d. Goot.

A. Head and antenna of apterous ♀; B. of alate ♀; C. Cornicles and cauda of apterous ♀; D. Variation of cornicles; E. Apex of rostrum.

*Alate viviparous female.* Head and thorax black. Abdomen bright yellowish, with green mottling and sometimes lines. Eyes red-brown. Antennæ dark. Legs brownish, apices of femora and tibiæ and the tarsi black. Cauda green. Cornicles black. Antennæ somewhat short, shorter than body; segment i. larger than ii.; iii. longer than iv. with 5 large round sensoria; iv. a little longer than v.; basal area of vi. not quite half as long as flagellum; the whole of vi. very little longer than iii. Cauda and cornicles as in apterous female. Wings normal; last fork of cubitus short.

Length 1.9 to 2 mm.

FOOD PLANTS. *Rubus idæus* and *Rosa spp.*

LOCALITIES. Great Salkeld, Penrith, v. 12 (Britten); Kingston-on-Thames, 2 v. 86; Boro' Green, Kent, 6 vi. 21 and Hastings, 7 vi. 20; Malling, 17 vi. 14; Maidstone, 14 vi. 12; Ash, 20 vii. 13; Wye, 4 vii. 17; (F.V.T.); Clapham, near Worthing, vi. 26 (Miss Machlachen); Putney; New Forest; Midhurst (F. Laing). Holland (Van der Goot); Russia (Dobrowljansky).

*Observations.* This green Aphis does not appear to be common, but I saw it doing a good deal of harm at Boro' Green to Raspberries. The specimens from Cumberland were from Raspberries. I have a note on this species badly curling Raspberry leaves at Kingston-on-Thames in 1886. It is a very marked species, the rather long, dark, outwardly turned cornicles being very characteristic. It lives under the leaves and on the young wood, the former may be curled or not. I have never found it on the Rose, but Van der Goot found alate females in June on Rose leaves. In 1926 it did a good deal of harm at Clapham, near Worthing, curling the leaves of the fruiting canes very badly and covering the fruit with a sticky mass of honey dew and excreta. The alatae became abundant in mid June. A few Syrphid larvæ were preying on them.

#### APHIS SAMBUCARIA Passerini.

Passerini, Gli Afidi, 36 (1860); Buckton, Mono. Brit. Aphid, II, 95, pl. LXVIII., figs. 6, 7 (1877); Macchiati, 287 (1883); Schouteden, Mém. Soc. Ent. Belg., XII., 227, 55 (1906).

*Alate viviparous female.* Green to deep green; thoracic lobes dark; abdomen green, often with thin transverse dorsal lines. Cornicles black. Cauda small, dusky. Rostrum green, dark at apex. Legs same colour as body. Antennæ deep olive, shorter than body; segment i. wider but no longer than ii.; iii. not quite twice as long as iv., with 24 to 28 round sensoria; iv. a little longer to the same length as v. with 6 to 8 sensoria; v. sometimes shows a sensorium near base, as well as the normal sub-apical one; base of vi. less than half v., flagellum about as long as segment iv. Cornicles about as long as antennal segment iii., cylindrical, constricted at apex; the dark cauda about half length of cornicles,

spinose, with a few hairs ; anal plate dark and spinose. First wing fork very small.

*Length 2 mm.*

*Apterous viviparous female.* Green to deep olive green. Antennæ dark, except at base. Cornicles and cauda dark. Legs same colour as body, apices of femora and tibiæ and the tarsi dark. Rostrum same colour as body, dark at apex. Antennæ a little shorter than body ; segment i. larger than ii. ; iii. considerably longer than iv. ; iv. a little longer than v. ; vi. with base half v. ; flagellum a little longer than iv. ; rostrum reaches to second coxæ. Cornicles cylindrical, slightly constricted at apices, a little longer than segment iii. of antennæ and much thicker, imbricated. Cauda about half length of cornicles and about same width at base, spinose, with a few hairs ; anal plate rather broad, spinose, dark. Legs with numerous hairs.

*Length 2 mm.*

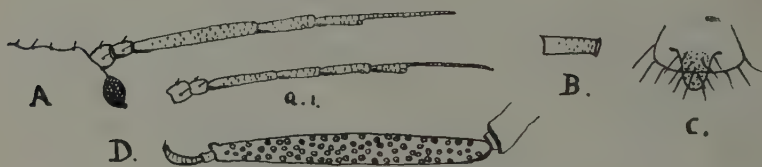


Fig. 64.—*Aphis sambucaria* Passerini.

A. and a¹. Two forms of antennæ of oviparous ♀ ; B. Cornicle ; C. Cauda and anal plate ; D. Hind tibia.

*Oviparous female.* Apterous. Colour varied, ochreous, pinkish-ochreous, rusty to ochreous-yellow ; abdomen with rusty red tinges and blotched, with irregular darker areas, often dusted with a fine powdery substance ; some few are pinkish-yellow, shaded with greenish-yellow. Head brown or greenish-brown. Legs dirty ochreous, with tibiæ of third pair brownish. Cornicles brownish-black. Antennæ with apices brownish ; very short, scarcely reaching to second coxæ ; of 5 to 6 segments ; segment i. wider but no longer than ii. ; iii. longer than iv. ; where there are 6 segments iv. is usually a little shorter than v. ; basal area of vi. not quite so long as v. and the flagellum not quite twice as long as basal area. Rostrum thick, reaching to or just beyond



second coxæ. Cornicles short, about as long as antennal segment iv.; cylindrical; imbricate. Cauda about as long as cornicles, much thicker; scarcely projecting beyond the rounded dark anal plate, both with a few hairs. Two irregular round dusky spots before cauda. Legs rather short and thick, especially the hind pair; hind tibiæ much broadened with numerous pale round sensoria, passing nearly to apex. Two or three dark ova show through skin.

*Length* 1.7 to 1.9 mm.

*Male.* Alate. Green; head and thorax black; pronotum black in middle. Eyes red, large. Antennæ brown; segment iii. green. The small abdomen tinged at the sides with rusty red and also at the apex. Cornicles black. Legs green, apices of femora and tibiæ dark; tarsi dark. In some specimens there are narrow dark transverse bars on the abdomen and small black lateral spots. Antennæ a little shorter than body; segment i. wider but no longer than ii.; iii. longer than iv., but not so long as vi., with 32 to 35 sensoria over whole length; iv. a little longer than v., with 17 to 20 sensoria over its whole length; v. with 12 to 14 sensoria over whole length; vi. with flagellum about three times as long as base. Rostrum reaches to second coxæ. Cornicles black, cylindrical, somewhat swollen at base; about as long as antennal segment iv., much longer than cauda; imbricate. Cauda black, rather long, bluntly triangulate, with many fine hairs, curved at apices. Anal plate black, with many fine hairs; flattened at sides. Penis pale; cone shaped claspers short, thick, black, spinose.

*Length* 1.6 to 1.8 mm.

FOOD PLANT. Elder (*Sambucus nigra*).

LOCALITIES. Wye, 15 ix. 13; Kingston-on-Thames, 2 ix. 09 (F.V.T.); Putney (Laing); North Wales, 11 vi. 22 (Walton); Invershin, N.B., 17-21 ix. 20 (D. J. Jackson); Brussels (Schouteden); Italy (Passerini).

*Observations.* Redescribed from a few alate viviparous females found in June and a few apteræ. Many sexuales may be found in autumn. The insect appears to be rare in summer but often occurs in vast numbers in autumn, under the Elder leaves.

Most oviparous females seem to contain but a single egg, a few two, rarely I have observed three ova in them.

*APHIS BECCABUNGÆ* Koch.

Koch, Die Pflanz., 146, pl. XXVII., 199, 200 (1854). Macchiati 238 (1883).

*Alate viviparous female.* Head black; pronotum with two black spots; mesonotum black. Abdomen yellowish-green, with traces of a median dark line and black lateral spots. Antennæ black. Legs black and green. Cornicles and cauda black. Antennæ shorter than body; segment i. larger than ii.; iii. longer than iv., about equal to flagellum of vi., with 9-11 pale round sensoria along whole length; iv. and v. equal; base of vi. two-thirds of v.; flagellum twice length of base. Cornicles cylindrical, expanding a little basally; imbricate, equal to base of vi. Cauda not quite so long as cornicles, with several curved hairs. Abdomen with small lateral papillæ. Rostrum to second coxæ.

*Length* 2 mm.

*Apterous viviparous female.* Green, some with darker longitudinal lines; antennæ green, apices dark. Legs green and deep brown. Cornicles and cauda deep green to brown. Antennæ shorter than body, a little more than half length. Cornicles short, about equal to base of vi. and v., cylindrical, slightly expanding basally. Cauda nearly as long as cornicles, with several curved hairs.

*Length* 1.5 to 1.8 mm.

FOOD PLANTS. *Veronica beccabunga*, *V. anagallis* and *Veronica* sp.

LOCALITIES. Wye, 19 vi. 11 (F.V.T.); Germany (Koch); Italy (Macchiati); New Zealand (Laing).

*Observations.* I have only found this species once, a single alate female and a few apteræ and larvæ.

*APHIS PRÆTERITA* Walker.

Walker, Zoologist, VII., App. lii. (1849).

*Alate viviparous female.* Head and thorax black; a green band before and behind pronotum. Abdomen green to dark

green, often with three deeper coloured transverse bars in front, smaller ones behind and dark lateral spots. Antennæ, cornicles, cauda and anal plate deep olive-green to black. Legs green to deep green, apices of femora and tibiæ dark, also tarsi. Wings large, insertions yellow. Antennæ a little shorter than body; segment i. wider but no longer than ii., very dark; iii. longer than iv., but shorter than vi., with 9 to 11 rather large round

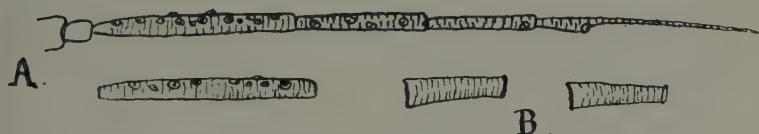


Fig. 65.—*Aphis præterita* Walker.  
A. Alate viviparous ♀ antenna; B. Cornicles.

sensoria, mainly on one side, spreading up to apex; iv. a little longer than v. with 4 sensoria; v. about twice as long as basal area of vi.; flagellum about as long as iv. + v. Eyes red. Rostrum reaches to about second coxæ. Cornicles cylindrical, base expanded, about as long as antennal segment v.; rather thin; imbricate. Cauda about half length of cornicles, projecting, 3 hairs each side. Anal plate rounded, black, some long hairs. Tibiæ with many short hairs.

Length 1.5 to 1.7 mm.

*Male.* Alate. Head and thorax black; abdomen green, with prominent black lateral spots and traces of dark bars. Antennæ, cornicles, cauda and anal plate deep olive green to black. Legs

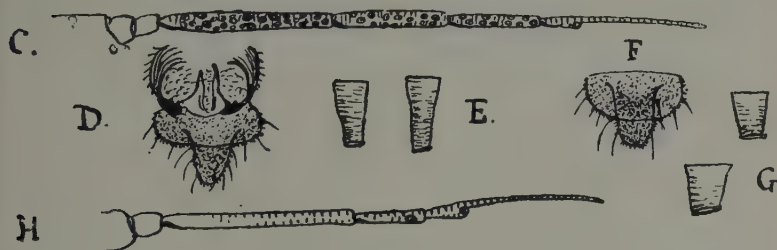


Fig. 66.—*Aphis præterita* Walker.  
C. Antenna of alate ♀; E. Cornicles of ♂; D. Male genitalia and cauda;  
F. Cauda and anal plate; G.H. Antenna of oviparous ♀.

olive green, apices of femora, tibiæ and the tarsi dark. Antennæ nearly to quite as long as body, segment i. larger than ii. ; iii. longer than iv., but not so long as vi., with 35 to 39 sensoria ; iv. scarcely longer than v., with 25 to 28 sensoria ; v. with 14 to 17 sensoria ; basal area of vi. less than half v. ; flagellum longer than iii. Eyes large, red. Rostrum reaches second coxæ. Cornicles cylindrical, bases expanded, about two-thirds length of antennal segment v. Cauda prominent, not so long as cornicles ; 3 hairs each side. Anal plate rather flattened, constricted at base, with a few hairs. Claspers dark, imbricate, with short hairs. Penis pale.

*Length* 1.4 to 1.7 mm.

*Oviparous female.* Apterous. Green ; cornicles, cauda and anal plate dusky. Apices of antennæ and rostrum dusky. Eyes deep red. Antennæ shorter than body, scarcely half the length of body ; segment i. much wider but no longer than ii. ; iii. and iv. more or less united ; iv. longer than basal area of vi. ; vi. about as long as iv. + v. ; iii. and iv. with some small hairs. Cornicles rather short and thick, about as long as antennal segment iv. Cauda prominent, as long as or a little longer than cornicles, broad, with several hairs. Anal plate large, rounded, with several hairs. Hind tibiæ slightly hairy, dusky, enlarged, with many large irregular round sensoria.

*Length* 1.3 mm.

*Apterous viviparous female.* " The body is small, oval, convex light green ; the antennæ are pale yellow ; with brown tips and as long as half the body ; the eyes are dark brown ; the rostrum is pale green, with a brown tip ; the tubes are pale green with brown tips and as long as one-eighth of the body ; the legs are dull green and moderately long ; the tarsi and the tips of the tibiæ are brown " (Walker).

FOOD PLANT. Willow Herb (*Epilobium* sp.).

LOCALITIES. Wye, 2 viii. 13 and 3 x. 11 ; Lymington, Hants., 3 viii. 15 (F.V.T.).

*Observations.* Unless this is an undescribed species it must be Walker's *Aphis præterita*. The alate viviparous female answers well to his description. I have not found any apteræ, but many

larvæ and nymphæ and the sexuales. It clusters on the leaves of the Willow Herb and produces marked pale patches on the foliage.

#### APHIS OCHROPUS Koch.

Koch, Die Pflanz, 128, 57, figs. 173, 174 (1854); Kaltenbach, Pflanz., Classe. Ins., 505 (1874); Theobald, Bd. Agri. Journ., XIX, 920 (1913).

*Alate viviparous female.* Head and thorax black, also antennæ and cornicles. Abdomen olive to deep olive green, with darker stripes and lateral spots. Legs yellow to orange-yellow, femora black; tarsi dark. Segment i. of antennæ a little wider but no longer than ii.; iii. a little longer than iv., with 13-17 sensoria; iv. a little longer than v.; base of vi. about half of v., the whole

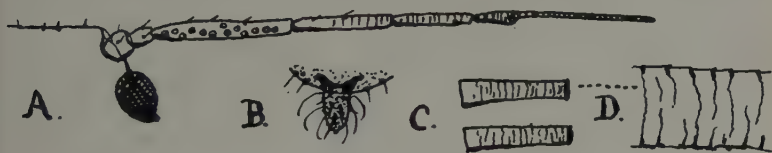


Fig. 67.—*Aphis ochropus* Koch.

Alate ♀. A. Antenna; B. Cauda and anal plate; C. and D. Cornicles.

segment as long as iv. + v. Cornicles about as long as antennal segment v. and thicker; cylindrical; imbricate. Cauda more than half length of cornicles. There are some dark green areas on thorax and the abdomen has paler lateral lines and some bands caudad of the cornicles. Antennæ shorter than body, yellowish with segments i. and ii. black; apices dusky.

*Length* 1.5 to 1.7 mm.

**FOOD PLANTS.** *Dipsacus sylvestris*; *Chenopodium polyspermum* and *Rumex spp.*

**LOCALITIES.** Wye, 30 vii. 11 (F.V.T.); Ellerbeck, Crook, Kendal, 15 vii. 14 (Rymer Roberts); Germany (Kaltenbach, Koch, etc).

**Observations.** Koch described this species from the Teazle and *Chenopodium*. Kaltenbach found his specimens in June

and July. I found it at Wye in 1911 on Docks (*Rumex* sp.) and again on *Chenopodium*. The dark cornicles are longer than the cauda and the antennal ornamentation is marked.

APHIS ACETOSELLA Theobald.

*Aphis acetosæ* Koch (non Linn., Buckton, etc.).

Koch, Die Pflanz, 145, figs. 197, 198 (1854); Theobald, Bull. Ent. Res., VIII., pt. II., 286, 13, fig. 12 (1918); Hall, Aphid. Egypt, 13 (1926).

*Alate viviparous female* (*Rumex* form). Head shiny black to very deep shiny olivaceous; eyes dark. Antennæ black; segment i. wider than, but same length as ii.; iii. longer than iv., but not quite so long as vi., with 13 to 19 sensoria over the whole length; iv. longer than v., with 2 to 6 sensoria, usually placed basally; v. 0.2; vi. as long as iv. + v., basal area about half as long as flagellum. Rostrum reaching to second coxæ, green, apex black. Pronotum green in front and behind, black between. Thorax shiny black. Abdomen green, very shiny; some with a dark green median line, others with the whole dorsum mottled with deeper green; on the sides of the abdomen are three dark spots, cephalad of cornicles. Venter of head and thorax dark green; sternal plates black; venter of abdomen black. Cuticle of abdomen markedly reticulate. Cauda dark green to dusky black; in some with a greenish apex; not so long as the cornicles; spinose, with four (? three) pairs of lateral hairs, the apical pair curved. Anal plate dark, with long apical hairs. Cornicles black; in some deep olivaceous, with a dusky marking on inner side of base (not equally visible in all specimens); slightly expanding basally and strongly imbricate. Cauda projecting well beyond cornicles. A pale pronotal papilla on each side, one between meso- and meta-thoracic legs, one caudad of cornicles and traces of 5 lateral abdominal ones. Legs with front femora dull ochreous-brown; tibiæ ochreous with black apices; tarsi black; second femora dusky, except at base; tibiæ ochreous, with black apices; tarsi black; third pair of legs same as second; in some specimens the legs have a greenish tinge. Wing insertions greenish; costa smoky; cubitus green; stigma smoky; lower margin greenish; veins dusky.

*Length* 2 to 2.5 mm.



*Alate viviparous female* (Papaver form). Very similar to the preceding form, but the antennæ are as follows: first three segments like those of *Rumex* form; iv. longer than v., with 1 to 4 sensoria, three being placed more towards the apex; basal area of vi. about one-fifth length of flagellum.

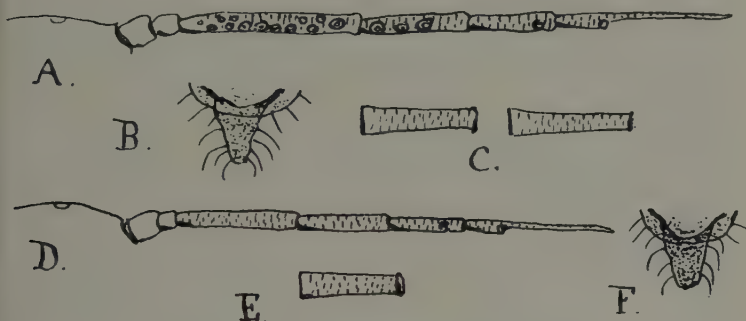


Fig. 68.—*Aphis acetosella* Theobald.

A.B.C. Alate ♀ antenna, cauda and cornicles; D.E.F. same of Apterous ♀.

*Apterous viviparous female* (Rumex form). Head greenish to reddish-yellow. Eyes deep reddish brown to black. Antennæ not half length of body; segment i. greenish; ii. greenish, apex dusky; iii. black except at base; iv. to vi. black; i. larger than ii.; iii. longer than four, nearly as long as vi.; iv. and v. nearly equal. Thorax and abdomen rich green with dark areas, some rich yellowish-green. Cornicles greenish with dusky apices; cylindrical, slightly expanding basally, faintly imbricated. Cauda yellowish-green, not quite so long as cornicles. Anal plate dusky, with a few apical hairs. Lateral papillæ as in alate female. Legs ochreous; apical parts of femora brownish-ochreous; apices of tibiæ brownish; tarsi black.

Length 1.5 to 2 mm.

*Apterous viviparous female* (Papaver form). Somewhat greenish yellow to pallid yellow. Head yellowish. Eyes deep brown. Antennal segments i. and ii. same colour as head; iii. and iv. pale; apex of v. smoky; vi. smoky. Thorax and abdomen yellow-green. Cornicles pale, with dark apices. Cuticle of thorax and abdomen finely crenulate. Some specimens show a

faint median dorsal and sub-dorsal line of a green hue. Legs pale, apices of tibiae pale brownish; tarsi black.

FOOD PLANTS. *Rumex* spp.; *Papaver* spp.

LOCALITIES. Wye, 7 vi. 15; Ghezireh, Cairo, 3 iii. 09 and 1 iv. 09 (F. C. Willcocks); Egypt (Hall); Germany (Koch).

*Observations.* Koch's species is clearly not the same as Linnæus' and Fabricius' *Aphis acetosæ*. The alate female of the two latter authors has two dark bars across the abdomen, as has also the *Aphis acetosæ* of Buckton. The insects I found at Wye and also those sent me from Egypt showed no trace of these bands. On the other hand they agree very closely with Koch's *Aphis acetosæ*. I propose a new name, *acetosella*, for this insect. Linnæus and Fabricius and Buckton's *acetosæ* I think are only pale varieties of *rumicis*, the dark transverse abdominal bands described being clearly seen in the latter when on certain plants and are more marked in certain years than in others, when on *Rumex*. Walker (List. Homop. Ins., B.M., IV., 982, 1852) placed Linnæus' *acetosæ* as a synonym of *rumicis*. In 1912 I considered it distinct on account of taking Koch's *acetosæ* for Linnæus' species (Journ. Bd. Agri., 467, 1912); Fabricius (Ent. Syst., IV., 220, 1794) says of *Aphis acetosæ* Linn.:—"Parvus totus niger fascia viride. Habitat in *Rumex acetosæ*." Buckton (Mono. Brit. Aphid., II., pl. lxii., 1877) says of his alate female, "Head and thorax shiny black. Abdomen shining, dark olive green, with obscure transverse bars," and of the apterous female, "dark brown to nearly black"; he figures the alate female as all black (pl. lxii., fig. 7). Miss Patch (Bull. 220, Maine Agri. Exp. Sta., 289-290, 1913) lists Linnæus' *acetosæ* on *Atriplex hortensis*. Hunter (1901, p. 104) and Kaltenbach (Die Pflanz. Ins., 519, 1874) record Fabricius' *acetosæ* on *Rumex conglomeratus*, presumably these records refer to Linnæus' species and not to the *acetosæ* of Koch.

#### APHIS TRIPOLII Laing.

Ent. Mo. Mag., 3, Se. V., 273 (1920).

*Apterous viviparous female.* "Ovate, vivid green, with irregular darker green on abdomen. *Antennæ* with segments i. to iii. very pale green, iv. to vi. darker green, half the length of the

insect, segments i. and ii. equal ; iii. a little shorter than vi. ; iv. a little longer than v., spur of vi. twice the length of the base ; proportions 3, 3, 10, 7, 6 (4 + 8), length .8 mm. Head green, eyes red, thoracic segments green, strong lateral tubercle on prothorax. Rostrum reaching to third pair of coxæ. Legs very pale yellow, distal end of tibiæ black, tarsi black. Lengths :

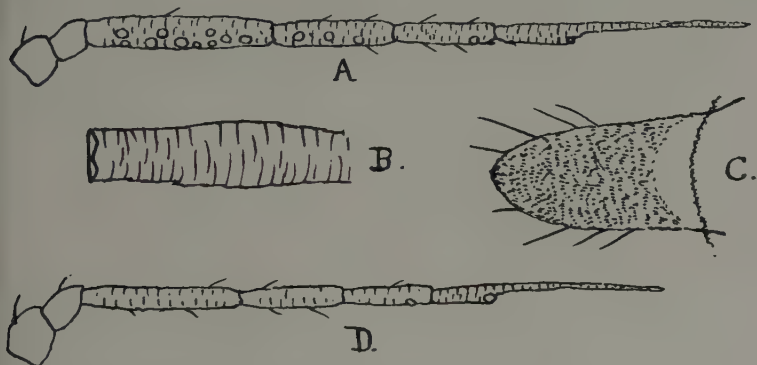


Fig. 69.—*Aphis tripolii* Laing.

A. Alate ♀ antenna ; B. Cornicle ; C. Cauda ; D. Apterous ♀ antenna (after Laing).

femora of i., .48 mm. ; iii., .72 mm. ; tibiæ of i., .80 mm. ; iii., 1.20 mm. ; tarsi of i., .20 mm., of iii., .20 mm. *Abdomen* with five marginal papillæ on segments 1 to 4 and 7. Cornicles dark brown, imbricated, slightly longer than the cauda, 0.2 mm. long. *Cauda* dark brown, a little shorter than cornicles, four marginal hairs.

*Length* 1.6 mm.

*Alate viviparous female.* Head, thorax black, abdomen green. *Antennæ* black, about two-thirds the length of the insect, segments i. and ii. equal ; iii. considerably shorter than vi. ; iv. and v. equal ; spur of vi. more than twice the length of the base ; iii. imbricated, with 9 to 11 secondary sensoria arranged along its whole length ; iv. with three sensoria ; v. with sometimes one sensorium, half way along ; proportions 15, 15, 65, 50, 56 (23 + 54), total length 1 mm. Head with one median and two lateral ocelli. *Rostrum* reaching to hind coxæ. *Prothorax* with a strong lateral spine. *Abdomen* with five pairs of marginal papillæ on segments 1 to 4 and 7. Cornicles dark brown,

imbricated, a little longer than cauda and slightly broader at the base than the apex, .18 mm long. *Cauda* dark brown, with four marginal hairs, .16 mm. long. Fore legs pale brown, middle and hind pairs pale brown, with the tips of the femora, tibiae and tarsi black. Length: femora i., .28 mm.; iii., .5 mm.; tibiae i., .54 mm.; iii., .80 mm.; tarsi i., .10 mm.; iii., .10 mm.

Length 1.5 mm.

LOCALITY. Shoeburyness, Essex, 31 viii. 19 (K. G. Blair).

FOOD PLANT. *Aster tripolium*.

Co-types in the British Museum." (F. Laing.)

# APHIS NEOPOLYGONI nov. nom.

*Aphis polygoni* V. d. Goot.

Tijds. voor. Entomo., LV., 80 to 82, fig. 11 (1912).

*Alate viviparous female*. Head and thorax black, abdomen green, with three large darker lateral spots before the cornicles and some small lateral papillae. Antennae, cornicles, cauda and anal plate olive green. Legs green, apices of tibiae, the tarsi and most of femora dark. Antennae shorter than body to nearly its length; segment i. a little wider than ii.; iii. longer than iv., pale just at base, shorter than vi., a little longer to nearly same length of flagellum, with 10 to 13 round sensoria; iv. a little longer than v., with 3 to 6 sensoria; v. with normal primary one, basal

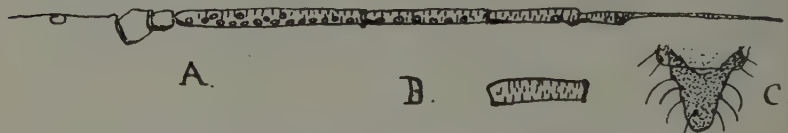


Fig. 70.—*Aphis neopolygoni* nov. nom.

A. Head and antenna of alate ♀; B. Cornicle; C. Cauda.

area of vi. more than half length of v. and rather more than one-third length of the flagellum. Rostrum yellowish-green, apex dark, reaching to second coxae. Cornicles about as long as segment iv. of antennae, cylindrical, slightly expanding basally, imbricate. Cauda a little shorter than cornicles, spinose, 3 long hairs each side. Anal plate spinose. Second cubital cell less than half the stem.

Length 1.8 to 2 mm.

*Apterous viviparous female.* " Körper gelblichgrün öder grün. Augen schwarz. Fühler schwarz, das dritte Glied gelblichweiss. Beine weisslich, Tars schwarz: Siphunculi olivengrün, Spitze derselben braun. Cauda gelblichgrün. Körper breit eirund, etwas gewölbt, unbehaart, mit ziemlich flachen Höckerchen an den Seiten des Prothorax, des ersten, des zweiten und des siebenten Hinterleibsringes. Fühler ziemlich kurz; Langenverhältniss der 5 letzten Glieder wie 20, 15, 14, 9, 20. Primäre Riechplatten mit feinem Haarkranz. Rüssel bis zum 2<sup>ten</sup> coxenpaare reichend. Siphunculi ziemlich lang, ungefähr cylindrisch. Cauda etwas kürzer als die Röhren. Rudimentäre Gonapophysen 3, ziemlich Klein. *Length* 1.94." (V. Der Goot).

FOOD PLANTS. *Polygonum fagopyrum*; *P. nodosum* and *P. sp.*

LOCALITIES. Wye, 20 vii. 11 (F.V.T.); Holland (V. de. Goot).

*Observations.* I have only once found this insect, all being alatae and young larvae, so I give Van der Goot's description of the apterae. The number of sensoria vary in the antennae, but there is no doubt that it is Van der Goot's species, which he found in July. The lateral papillae are not so marked in the alatae as in the apterae. Owing to Van der Goot's specific name being preoccupied, I have renamed it. Macchiati, Bull. Ent. Soc. Ital. p. 63, 1885, also described an *Aphis polygoni* in addition to Walker. Lichtenstein's *A. polygoni* was nom. nud.

#### APHIS AVENÆ Fabricius.

*Aphis avenæ* Fabricius.

*Aphis padi* Kaltenbach, V. d. Goot, Theobald.

*Aphis holci* Ferrari?

Fabricius, Ent. Syst. IV., 214, (1794); Buckton, Mono. Brit. Aphid II, 61, pl. lv., figs. 3 and 4 (1877); Van der Goot, Beit. 2, Kennt. Holland. Blattlause, 241 (1915); Theobald, Bull., II., S.E.A. Coll. Res. Dept., 10, figs. 4 and 5 (1923); Del Guercio, Redia, IX., 198, pl. XI., figs. 1-4 (1913); Theobald, Bull. 2, S.E.A. Coll., 10, figs. 7 and 15, fig. 6 (1924).

*Alate viviparous female* (Prunus form). Head, pronotum and thorax deep brown to deep blackish-brown; abdomen green, with three dark lateral spots and traces of darker mottlings and bands

in some specimens; antennæ brown to almost black, shorter than body, in some traces of yellow at base of segment iii. Wings with brown cubitus, stigma and veins; second cubital cell small. Antennal segment iii. longer than iv., but shorter than vi., with

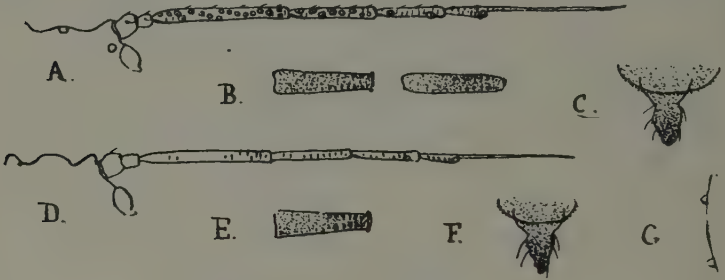


Fig. 71.—*Aphis avenae* Fabricius.

A. Head and antenna of alate ♀; B. Cornicles; C. Cauda of alate ♀ on corn; D. E. F. Apterous ♀; G. Abdominal papillæ.

18-35 sensoria over whole length, iv. longer than v. to almost same length with 6 to 19 sensoria over whole length; v. with 0-6 + 1 primary; basal area of vi. about half of v.; flagellum as basal area + iv. + v. Cornicles as long as antennal segment iv., irregularly cylindrical. Cauda about half of cornicles.

*Length* 2 to 2.6 mm.

*Apterous viviparous female* (on *Prunus cerasus*). Yellowish-green, with three deeper green stripes, sometimes with yellowish-red posteriorly; legs, antennæ and cornicles yellow; cornicles and antennæ dark at apices; apices of tibiæ and the tarsi dark; cauda and anal plate brown; cauda not so long as cornicles. Abdomen with small lateral papillæ. Antennæ much shorter than body; segment iii. longer than iv. and a little shorter than vi.; iv. a little longer than v.; base of vi. half to more the length of flagellum; vi. all dark. Rostrum to second coxæ. Cornicles about as long as antennal segment iv., cylindrical, slightly expanding basally and in some constricted at apex. Some show rusty coloured areas at base of the cornicles and in others the head is greenish.

*Length* 1.8 to 2 mm.



*Alate viviparous female* (on Corn and Grasses). Head and thorax dark brown, thoracic lobes black; abdomen green, with black lateral patches and two black bars behind; antennæ dark, about two-thirds length of body; anal plate and cauda dusky; legs same colour as body, mid and hind femora mostly dark, apices of tibiæ broadly black; tarsi dark. Antennal segment iii. longer than iv., shorter than vi. with 16 to 23 sensoria over whole

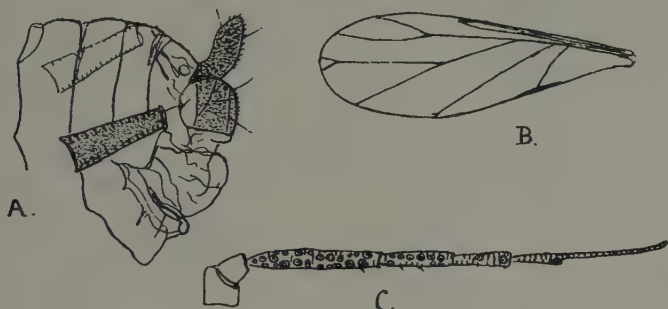


Fig. 72.—*Aphis avenae* Fabricius.

A. Cornicles and cauda of alate ♀; B. Wing; C. antenna.

length; iv. a little longer than v. with 5 to 9 sensoria; v. with 0 to 2 + 1 primary one; v. longer than base of vi.; flagellum moderately long. Rostrum reaches to second coxæ. Cornicles cylindrical, some slightly swelling before the constricted apex, about as long as antennal segment iv. Cauda nearly half length of cornicles, acuminate, constricted towards base.

*Length* 2.2 to 3 mm.

*Apterous viviparous female* (on Corn and Grasses). Green, oval, in some head slightly darkened; cauda and anal plate dusky; cornicles deep olive-green to brown; antennæ green to deep olive green, darkened apically; legs same colour as body; apices of tibiæ and the tarsi dark. Antennæ more than half length of body; segment iii. longer than iv.; iv. slightly longer than v.; iv. + v. about equal to iii.; base of vi. about half of v.; flagellum long. Cornicles longer and thicker than antennal segment iv., cylindrical, expanding basally. Cauda about half length of cornicles, constricted near base. Rostrum reaches to or past second coxæ. Small lateral abdominal papillæ present.

*Length* 1.2 to 2 mm.

*Male.* Alate, darker than alate female; antennæ dark, longer than body, which is small; segment iii. longer than iv. with 45 to 58 sensoria over whole length; iv. and v. nearly equal; iv. with 19 to 36 sensoria over whole length; v. with 14 to 23 sensoria; basal area of vi. about one-half of v. Rostrum

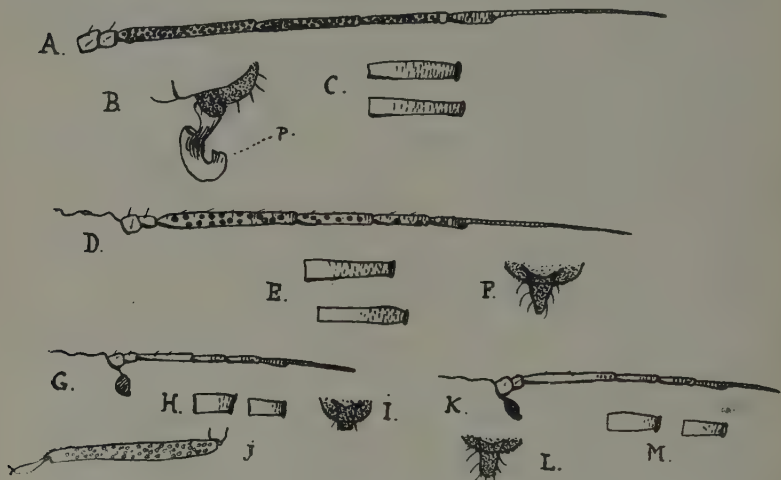


Fig. 73.—*Aphis avenae* Fabricius.

A. Antenna of male; B. Penis (P.); C. Cornicles; D. Head and antenna of alate ♀ on *Prunus padus*; E. Cornicles; F. Cauda; G. H. I. J., Oviparous ♀; K. L.M. Apterous viviparous ♀.

reaching to or about to second coxæ. Cornicles black, more or less cylindrical, in some slightly swelling on apical half, not quite so long as antennal segment iv. Cauda and anal plate dark. Claspers dark. Penis yellow. Legs with dark femora, especially hind pair; tibiæ pale except at apices; tarsi dark. Wings large; veins and stigma yellowish-brown; second cubital cell less than half length of stem. Length 1.3 to 1.5 mm.

*Oviparous female.* Apterous. Yellowish to yellowish-green, oval or elongate oval. Antennæ shorter than body, yellow at base; segments iv. to vi. dark; iii. nearly twice as long as iv., shorter than vi. and even its flagellum; iv. and v. about equal; base of vi. a little more than half of v. Cornicles rather thick, narrowed slightly towards apices, yellowish, base

dusky. Cauda thick, not so long as the cornicles. Anal plate dusky. Rostrum reaches to third coxæ. Legs yellow, except tarsi; hind tibiæ nearly as broad as the femora with 38 to 45 faint sensoria.

Length 0.9 to 1 mm.

FOOD PLANTS. Bird Cherry (*Prunus padus*); Wild Cherry (*Prunus cerasus*); Wheat; Oats; Barley; and several species of wild and cultivated grasses. Walker\* gives *Cydonia vulgaris*; *Sorbus aucuparia* and *Mespilus germanica*.

LOCALITIES. Bearsted, ix. 13; Wye and Crundale, v. 14 (F.V.T.); Harpenden, vii. 20 on Corn (Rymer Roberts); Romsey, Hants, vi. 13, on Corn (F.V.T.); Bangor, v. 23, on Wheat (C. L. Walton); Aberystwyth, v. 23, on Wheat (Jenkins); Windermere, iv. 14 and vii. 14, on *Prunus* and Corn (Rymer Roberts); Carlisle (Walker).

Observations. This has been confused with *Aphis padi* Linnæus. Plentiful where it occurs. Buckton says the apterous females occur on *Prunus padus* in April, but the winged fly is by far the most abundant in June. I have found apteræ on *P. padus* very early in April. It leaves the Bird Cherry, etc., from the end of April to the end of June, the alatæ flying away and those that settle on cereals and grasses live there until late July, August or September, when an alate brood flies back to *Prunus* and later the alate males. The sexuales occur mostly on *P. padus*, but also on *P. cerasus* and may be found into November, most in October. The ova are placed in both shoots and leaves and hatch out early in Spring. It now and then seriously attacks Wheat and Oats. The viviparæ are very like *prunifoliæ*, but the sexuales are very distinct.

The form on Cereals differs from *prunifoliæ* in the shorter antennæ of the latter and in its more vasiform cornicles.

Its presence on Bird Cherry is not often noticed except in autumn, although it curls up the leaves. As far as I can see at present some may remain on Cereals and Grasses all the winter, but the usual course is to winter in the egg stage on *Prunus padus*, etc., I have not attempted to trace the synonymy of this species or given the references from American sources as the whole matter is at present very confused.

\* Walker's *padi* is Koch's *infuscata*; *padi* is *helichrysi* Kaltenbach.

## APHIS SOLANINA Passerini.

Passerini, Aphid. Italicae, 41 (1863); Theobald, Bull. Res., I., 10. fig. 7, S.E.A.C. (1922); Entom., LII., 161, 1919; Macchiati, 257 (1883).

*Apterous viviparous female.* Green; apices of antennae and tibiae and the tarsi dusky. Cornicles a little deeper green than body and slightly darkened at apices. Anal plate and cauda deep green. Eyes red. Antennae shorter than body, about three-quarters its length; segment i. wider but no longer than ii.; iii. longer than iv., not so long as vi.; iv. a little longer than v.; vi. with basal area three-quarters of v. and rather more than one-third length of flagellum; sensoria normal. Cornicles from half to two-thirds length of antennal segment iii., cylindrical, some broadly expanding towards base, very variable in length, always thick and faintly imbricated. Cauda prominent, from two-thirds length of cornicles to longer; broad, expanding basally and bluntly pointed, with 3 hairs each side. Anal plate broadly rounded, with several fine hairs. Legs with very fine hairs on tibiae and a few on apices of femora. Abdomen with a few small hairs and small lateral papillae.

Length 1.2 to 1.6 mm.

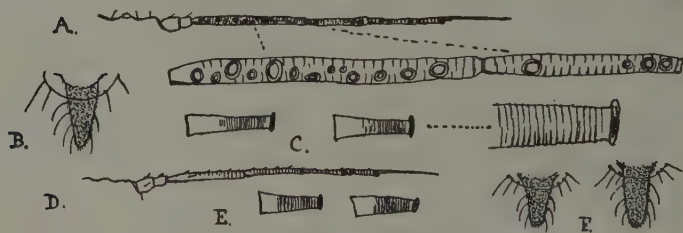


Fig. 74.—*Aphis solanina* Passerini.

A. Head and antenna of alate female; B. Cauda; C. Cornicles; D. Head and antenna of apterous female; E. Cornicles; F. Cauda.

*Alate viviparous females.* Head and thorax deep olive green, the thoracic lobes shiny black. Eyes red. Cornicles, cauda and anal plate deep olive green to almost black. Abdomen green, with dark lateral spots. Antennae olive green, apices paler. Legs olive-green, base of femora and base and middle of tibiae paler. Apex of rostrum dark. Antennae shorter than body;

segment i. a little wider but no longer than ii., both dark ; iii. longer than iv., but shorter than vi., with 9 to 14 large round sensoria, mainly on one side ; iv. longer than vi., with 2 to 6 sensoria irregularly placed ; basal area of vi. about three-quarters of v. and rather less than one-third the flagellum, the latter paler than rest of antennæ. Eyes very large and stemmata well defined. Rostrum reaching to about second coxæ. Cornicles shorter than antennal segment v., cylindrical, in some expanding basally, imbricate, almost striate. Cauda about three-quarters length of cornicles, bluntly acuminate, very spinose ; 5 hairs one side, 4 the other, the basal of the 5 very small. Abdominal papillæ small. Wings rather large. Tibiæ with very short hairs, and some on apices of femora.

*Length* 1.7 to 2 mm.

**FOOD PLANT.** Potato (*Solanum tuberosum*).

**LOCALITIES.** Rothamsted, 7 viii. 16 (Rymer Roberts) ; Great Salkeld, Cumberland, 2 viii. 12 (Britten) ; Helsby, Warrington, 5 ix. 13 ; Wye, 7 viii. 14 and 4 ix. 17 ; Little Hadham, viii. 15 ; Maidstone, viii. 17 ; Abindgon, vii. 15 ; Rye, viii. 09 (F.V.T.) ; Wagenengen, Holland (F.V.T.) ; Italy (Passerini).

**Observations.** A small green *Aphis* often common on Potatoes. The localities where recorded are when it has done considerable damage. It is peculiar in the great variation of the length of the cornicles and cauda, even amongst specimens on the same leaf and also in the colour variation. It can at once be told from other Potato Aphides by its smaller size and shorter cornicles. The species so far recorded from the Potato are *Aphis gossypii* Glover and *Aphis rumicis* Linn. *Aphis solanina* was described by Passerini from *Solanum elæagnifolium* and *S. sodomium*. Scopoli's *Aphis scabiosæ* has been recorded from *Solanum gigantium* (this is possibly *solanina*) ; *Aphis silybi* Passerini on *Solanum guimanense*, *Aphis nerii* Kaltenbach on *Solanum nigrum*, with *Aphis rumicis* Linn. and *Aphis silybi* Passerini. I have described a species from Africa as *Aphis solanella* (Bull. Ent. Res., IV., 325, 1914) which is quite distinct from the European species. The remaining Potato Aphides are *Myzus persicæ* Sulzer ; *Macrosiphum gei* Koch. ; *M. lactucæ* Linn. ; *M. sonchi* Linn. ; *Megoura solani*

Thomas; *Trifidaphis radicola* Essig (Pomona, Journ. Ent., I., 8, 1909); the last three from America. Kaltenbach described an *Aphis solani* (Die Pflanz., 15, 1843), but it is extremely difficult to say what it is; it may be that it is the *Macrosiphum gei* of Koch, common on Potatoes in England, Ireland, Wales, France, Belgium and America.

*APHIS GITHAGINELLA* sp. nov.

*Alate viviparous female.* Head olive green, a pale band behind; thorax deep brown, with darker lobes. Abdomen pale yellowish-green with small dark lateral spots; some show darker median patches and stripes. Antennæ pale olive-green. Cornicles deeper olive-green. Cauda dark, also anal plate. Legs green, apices of tibiæ and the tarsi dark. Eyes deep red. Antennæ a little shorter than body; segment i. wider but scarcely longer than ii., iii. a little longer and thicker than iv., but not so long as vi., with 13 to 18 sensoria, of different sizes, 3 notably larger than remainder; iv. a little longer than v., with 6 to 10 round sensoria along one side; v. with apical sensorium some little distance from

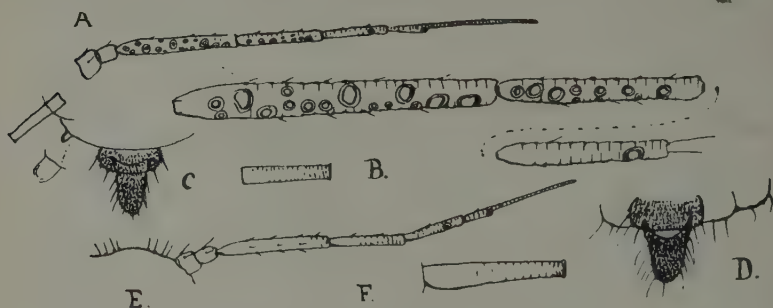


Fig. 75.—*Aphis githaginella* sp. nov.

A. Antennæ and further enlarged segments of alate ♀; B. Cornicle; C. Cauda; D. Cauda; E. Antenna; F. Cornicle of apterous ♀.

tip; vi. with basal area nearly as long as v. to about half the length; flagellum longer than iii.; iii. to v. with a few hairs. Cornicles cylindrical, rather thick, about as long as antennal segment v., imbricate. Cauda more than half length of cornicles, rather thicker, several fine hairs each side and 3 dorsal sub-apical ones. Anal plate rounded, large, with several long hairs. A prominent papilla each side near third pair of legs and between



the cauda and cornicles and a small one each side of pronotum. A few hairs on body. Rostrum reaches to second coxæ. A few hairs on femora and tibiæ. Wing insertions pale, veins and stigma yellow grey.

*Length* 1.4 to 2 mm.

*Apteros viviparous female.* Green; apices of antennæ and tibiæ and all cauda and tarsi darker; body broadened posteriorly and with 4 pairs of prominent blunt lateral tubercles. Antennæ not quite so long as body; segment i. wider but no longer than ii.; iii. longer than iv., but not so long as vi.; iv. longer than v.; the basal area of vi. about two-thirds length of v.; flagellum rather short, about as long as iii.; iii. to v. with a few hairs, a few also on head and antennal segments i. and ii. Eyes large, red. Rostrum reaches to third coxæ. Cornicles pale, cylindrical, somewhat curved on one side at base, faintly imbricate, longer than antennal segment iii. Cauda large, about two-thirds length of cornicles, wider, dark, constricted on each side towards base, a few long hairs. Anal plate dark, with several long hairs. Body with a few scattered hairs. Legs moderately long and thick, with many outstanding, rather long hairs on femora and tibiæ.

*Length* 1.3 to 2 mm.

FOOD PLANT. The Corncockle (*Lychnis githago*).

LOCALITIES. Old Roar, Hastings and Battle, 20-25 vii. 04.

*Observations.* Very abundant on the flower stalks, as apteræ, alatæ and nymphæ. It is very marked and characterised by the pronounced difference in the shape of the sensoria on antennal segment iii. in the alate females. The pale cornicles and large dark cauda of the apteræ are also characteristic.

APHIS GROSSULARIÆ Kaltenbach.

Kaltenbach, Mono. de Pflanz, 67 (1843); Walker, List. Hom. (B.M.), IV., 1012 (1852); Koch, Die Pflanz, 99, 38, figs. 133, 134, (1854); Schouteden, Mem. Soc. Ent. Belg., XII., 221 (1906); Theobald, Journ. Eco. Biol., VII., 3, 99-101, pl. II., fig. 3 (1912); Haviland, Proc. Camb. Phil. Soc., XIX., 266-269.

*Alate viviparous female.* Head and thorax blackish; with now and then a pale green band on the pronotum. Abdomen

deep greenish-yellow to very dark green ; some specimens show faint paler lines running from one end of the abdomen to the other. A blunt spine each side of pronotum and four pairs of blunt lateral tubercles on sides of abdomen and traces of one or two between cornicles and cauda. Antennæ much shorter than body, black ; segment i. wider than ii. ; iii. longer than iv., but not so long as vi. ; iv. longer than v. ; iii. with 8 to 12 sensoria over its whole length ; iv. with 5 to 7 sensoria ; v. with 3 to 4 sensoria ; basal area of vi. often nearly as long as v. ; flagellum from 2 to 3 times as long as basal area. Cauda yellowish-green to green ; shorter than cornicles, with a few hairs. Anal plate dark green. Legs dark green ; apices of femora and tibiæ and all the tarsi black. Wing insertions yellow ; stigma grey. Hairs simple.

*Length* 1.3 to 2 mm.

*Apterous viviparous female.* Deep bright green to very dark green, some blackish-green. Abdomen with paired blunt lateral processes, two pairs between cornicles and cauda. Cauda and cornicles pale yellowish-green to very pale yellow. Cornicles with apex dusky ; cylindrical and faintly imbricate. Antennæ shorter than body, green to pale yellowish-green, last two segments dusky ; i. larger than ii. ; iii. longer than iv., but shorter than vi. ; iv. a little longer than v. ; basal area of vi. about as long as v., flagellum about twice as long as basal area. Legs paler green than body ; femora slightly swollen, apices dusky ; apices of tibiæ dusky ; tarsi dark.

*Length* 1.5 to 1.8 mm.

FOOD PLANTS. Gooseberry ; Red, Black and White Currants ; Guelder Rose (*Viburnum opulus*).

LOCALITIES. Ash ; Yalding Tonbridge ; Tenterden ; Maidstone area ; Chelsfield ; Swanley ; Hythe ; Appledore ; Sellindge ; Faversham ; Selling ; Ashford ; Canterbury ; Marden ; Wye ; Sittingbourne area ; Ramsgate ; Sevenoaks in Kent. Hailsham ; Hastings ; Rye ; Lewes ; Coleman's Hatch ; Worthing ; Rudgwick ; Horsham in Sussex. Bramley ; Esher ; Guildford ; Kingston-on-Thames ; Woking ; New Malden in Surrey. Evesham ; Tenbury ; Worcester ; Pershore ; Haddenham ; Wisbech ; Cambridge ; Widdington and Colchester in Essex. Little Hadham, Herts.

Lymington ; Isle of Wight ; Bournemouth ; Lyndhurst in Hampshire. Norwich ; Ipswich ; Penrith, Cumberland ; Bradford ; Derby ; Birmingham ; Torquay ; Aberdeen (Laing). Germany (Kaltenbach) ; Rouen, France (F.V.T.).

*Observations.* A very abundant and harmful insect to *Ribes* in some seasons, especially to Gooseberries and Red Currants, but now and then on Blacks and Whites. The Aphides produce a dense clustering of the apical leaves and so distort the shoots that growth is practically stopped. The Aphides settle on the young wood of the tips of the shoots and by constant sucking check the growth, the result being that the leaves grow out close together and then the Aphides cluster under them and cause them to turn downwards in a dense overlapping mass. It is found from the middle or end of May until July on the *Ribes*. Alate females appear in late May, June and July, by the middle of the latter month all seem to have left the *Ribes*. They occur again on the *Ribes* in autumn. Kaltenbach refers to it on the Gooseberry in June and July and even in August on the Black Currant. Koch refers to alate and apterous females at the end of May. An alternate host plant is the Guelder Rose (*Viburnum opulus*) where they produce similar leaf-curling and also occur on the stalks and often commingled with other *Viburnum* Aphides.

APHIS SALICETI Kaltenbach.

*Aphis salicicola* Monell.

*Aphis salicicola* Thomas.

*Aphis yanagicola* Matsumura.

*Salicifex* Amyot.

*Aphis theobaldi* Gillette and Bragg.

Kaltenbach, Mono. Pflanz, 103, 78 (1843) ; Ratzburg, Forst. Ins., III., 217, 11 (1844) ; Walker, List. Homop. (B.M.), IV., 1,005, 131 (1852) ; Amyot, Ann. Soc. Ent., Fr. V., 479 (1872) ; Koch, Die Pflanz, 118, figs. 157-160 (1857) ; Buckton, Mono. Brit. Aphid., II., 52, pl. LI., bis (1877) ; Thomas, Bull. 2. Ill. St. Lab. Nat. Hist., 8 (1878) ; Monell, Bull. 5, U.S. Geol. Surv., 24 (1879) ; Oestlund, Bull. 4, Geol. and Nat. Hist. Surv., Minnesota, 62 (1882) ; Schouteden, Mem. Soc. Ent. Belg., XII., 227, 54 (1906) ; Davis, Journ. Eco. Ent., III., 490 (1910) ; Davidson, Journ. Eco. Ent., V., 408 (1912) ; Patch, Bull. 213, Maine Agri. Exp. Sta., 81 (1913) ;

Theobald, Rept. Eco. Zool., 1912, 84, fig. 24, pl. XIII. (1913); Haviland, Ann. App. Biol., VI., 4, 311 (1920); V. d. Goot, Kennt. Holland Blattläuse, 225 (1915); Matsumura, Jn. Coll. Agri., Sapporo, VII., pt. 6, 390 (1917); Gillette and Bragg, Canad. Ent., 4, 89 (1918) (=theobaldi); Takahashi, Aphid. Formosa, II., 104 (1923).

*Alate viviparous female.* Head and thorax black; abdomen green, with dark and bright green mottling, with dark lateral spots. Antennæ dark brown, shorter than body, in some segments iii. to v. are paler, often a brownish-yellow; segment i. wider than ii.; iii. longer than iv., but not so long as vi., with 4 to 8 sensoria; iv. about as long as v.; basal area of vi. rather more than half v.; flagellum twice as long as basal area. Rostrum nearly reaches third coxæ. Cornicles long, cylindrical, rather thick, yellow with dusky apex to deep olive-green, as long as or

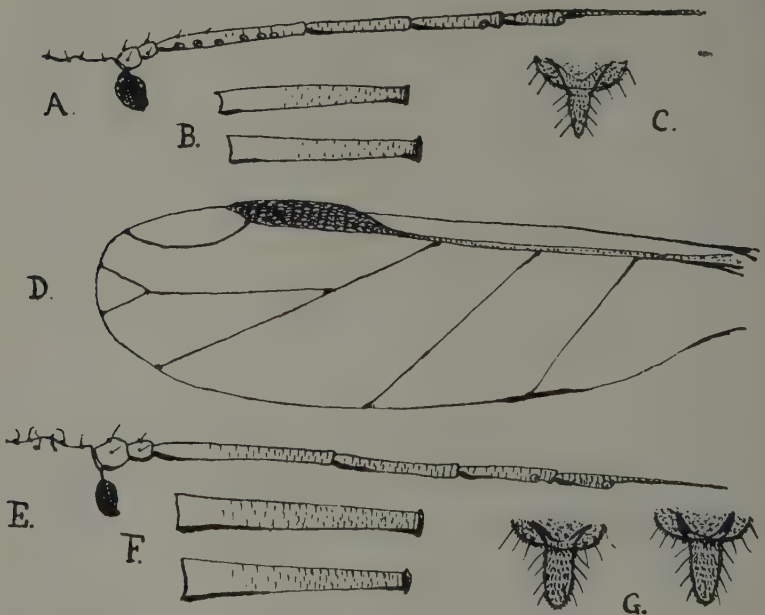


Fig. 76.—*Aphis saliceti* Kaltenbach.

A. Alate ♀, Head and antenna; B. Cornicles; C. Cauda and anal plate; D. Fore wing; E. Head and antennæ of apterous ♀; F. Cornicles; G. Cauda.

longer than antennal segment vi. Cauda yellowish-green to deep green, about quarter length of cornicles ; about as thick, spinose, with 3 to 4 lateral hairs, usually 3 one side and 4 the other. Anal plate dusky green, rounded, hairy. Legs olive to yellowish-brown, apices of femora and tibiæ and the tarsi black. Wing insertions yellowish, stigma greyish ; cubital cell very small.

*Length* 1.8 to 2 mm.



Fig. 77.—*Aphis saliceti* Kalténbach.  
Alate viviparous ♀.

*Apterous viviparous female.* Bright green to yellowish-green, or orange, now and then brown ; oval, rather broadened behind. Pronotal papillæ marked. Antennæ shorter than body, pale yellowish ; segments i. and ii. a little darker and apices of iv. and v. and all vi. ; segment i. a little wider than ii. ; iii. twice as long as iv. and as long or even longer than vi. ; iv. longer than v. ; basal area of vi. more than half as long as v. and half as long as the flagellum. Rostrum yellow, apex dusky, reaching nearly to third coxæ. Cornicles yellow, in some apices brown, divergent, long, much longer than antennal segment iii. and thicker ; faintly imbricate. Cauda dark green, about one-third to one-quarter length of cornicles, 3 hairs one side, 4 the other. Anal plate dark green. Legs dull whitish-green to dirty yellowish ; apices of femora dusky, of tibiæ dark brown ; tarsi dark.

*Length* 1.6 to 1.8 mm.

*Oviparous female.* Apterous. Green of various shades. Oval to elliptical; posterior segments rather elongate. Cauda and anal plate deeper green. Cornicles deep green. Legs pale greenish-brown to almost green, apices of tibiae and the tarsi dark. Some specimens deep yellowish-green, others almost brown; the dark eggs show within. Pronotal papilla each side and some on the abdomen, a marked one between cornicles and cauda. Antennae much shorter than body; segment i. larger than ii.; iii. a little longer than iv. and much shorter than vi.; iv. and v. about equal, in some the former is slightly shorter; vi. with basal

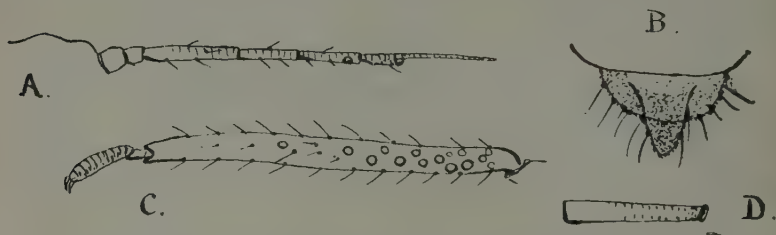


Fig. 78.—*Aphis saliceti* Kaltenbach.

A. Head and antenna of oviparous ♀; B. Cauda and anal plate; C. Hind tibia.

area a little shorter than iv.; flagellum not twice its length. Cornicles nearly as long as segments iii. and iv. of antennae, cylindrical, in some slightly expanding basally. Cauda with 2 hairs one side, 3 the other and a sub-apical one; not quite half as long as the cornicles. Anal plate large, rounded, spinose, with many hairs. Hind tibiae not swollen, with a few large round sensoria on basal half; tibiae with short hairs.

*Length* 1.6 to 1.8 mm.

*Male.* I have not seen the male but append Miss Haviland's description. "Apterous. Short. Oval. *Length* .92 mm. Breadth of abdomen .50 mm. Head dusky. Total length of antennae 1.00 mm.; colour dark brown; with numerous supplementary sensoria on segments iii., iv. and v. Thorax and abdomen orange brown (rarely green), with a few darker markings on the dorsum. Genital plates dusky. Cauda pale brown or green. Cornicles pale brown (or green), with dark imbricated



scales; length .28 mm. Legs pale brown, very long and stout with stiff hairs on femora and tibiae. Tibial joints and tarsi dusky."

FOOD PLANTS. Willows and Osiers (*Salix viminalis*, *Salix caprea*, etc.).

LOCALITIES. Camberley, Surrey, 1 vi. 14; Bowden, Cheshire, 30 vi. 10; Shadoxhurst, near Ashford, Kent, vi. 26; Wye, 2 v. 14; vii. 16; vii. 20; near Kingston, Derbyshire, vi. 11; St. Neots, Hunts, vi. 99; Enfield, vii. 90; Okehampton, Devon, v. 10; Sidmouth, viii. 99; Gloucester, vii. 94; Tenby, viii. 90; Barmouth, vi. 01; Lymington, viii. 15 (oviparous females); Hastings, ix. 1902; Cambridge, viii. ovi. females, 1889; Selby, Yorks., ix. 1899 (F.V.T.); Newborough, Anglesey, vii. 23 (C. L. Walton); Wimbledon Common, etc. (common around London); Iver, Bucks.; New Forest; Lynton; Torquay (Laing); Formosa (Takahasi); America (Gillette & Bragg, etc.).

*Observations.* This species is subject to much variation in colour in the apterous stages, both the viviparous and oviparous females. It is often very common on Willows and Osiers in June and July and often does much damage in Osier beds. Masses of them occur up the tops of the shoots. It is very largely attended by ants, which carry it from place to place. This *Aphis* is peculiar in that the sexuales occur in summer. I have found the apterous oviparous females to be very abundant in late June and July, but have never seen any males.

This unusual occurrence has been observed in America\* and Europe.

Buckton, however, records finding the sexuales of his *Siphonophora muralis* on *Lactuca* during the first week in July, but the females contained no eggs (Brit. Aphid., II., 149). Koch also mentions finding the males of *Myzus persicae* in May. As a rule the sexuales of this species occur in autumn. Miss Haviland says, "it is possible that with further study of the life-cycles of different Aphides, the appearance of sexuales in the summer will prove to be more frequent than is now supposed to be and that

\* Canad. Ent. L. No. 3, Gillette and Bragg (1918), and Carnegie Institute, Wash. 51, Stevens (1906).

the disappearance of some forms, which is at present attributed to the migrations of a biphytophagous species to a second host plant, will prove to be part of the normal cycle of a monophytophagous species after the production of fertile ova." After watching and collecting Aphides for now over thirty years I have only twice come across any summer sexuales and in all other cases the sexuales have occurred in the autumn. In my Report on Economic Zoology for 1912, p. 84, the true *saliceti* and *capreae* are confused.

#### APHIS URTICARIA Kalténbach.

##### *Aphis urticae* Fonscolombe.

Kaltenbach, Mono. Pflanz, 57 (1843); Koch, Die Pflanz, 101, figs. 135, 136 (1857); Walker, Ann. Nat. Hist., Se. 2, IV., 41, 66, 18 (1849); Fonscolombe, Ann. Soc. Ent. Fr., X., 180, 21 (1841); Walker, List. Hom. (B.M.), IV., 977, 74 (1852); Ferrari, 64 (1872); Buckton, Mono. Brit. Aphid., II., 50, pl. LI., 1-4 figs. (1877).

*Alate viviparous female.* Head and thorax black. Abdomen green, in some uniform in colour, in others mottled. Eyes red. Antennæ shorter than body, in some all dark, in others pale greenish from base to apex of segment iv. Cornicles moderately long, dark greenish-brown to deep brown or green. Cauda deep green, half length of cornicles. Legs brownish to greenish-yellow; apex of femora and tibiæ black, also tarsi. Wings with yellowish insertions; stigma dusky; cubitus and veins dark. Basal segment of antennæ wider but no larger than ii.; iii. scarcely longer than iv., with 5 to 8 large round sensoria, reaching to apex; iv. about as long or very slightly longer than v., with 3 to 5 large round sensoria; vi. about as long as iv. + v., its basal area rather more than half of v. and less than half of the flagellum. Pronotum with a large papilla each side. Abdomen with 4 pairs of lateral papillæ before cornicles and one large and one small one between cauda and cornicles. Cornicles narrow, cylindrical, constricted at bases, about as long as antennal segment iii.; imbricated. Cauda and anal plate spinose, with a few hairs. Apices of femora and tibiæ with short hairs. Fork-cell of fore wings very small.

*Length* 1.8 to 2 mm.

*Apterous viviparous female.* Oval to globular, dull green, yellow green, yellow or mottled green to darker green. Head yellowish. Eyes red, reddish-brown. Antennæ shorter than body, pale, often almost white, except on the last three segments and the two basal ones may be green to deep green. Rostrum pale, apex dark, reaching to about second coxæ. Cornicles pale yellowish to almost white, apices dusky. Cauda yellowish to yellowish-white, about half length of cornicles. Legs pale,

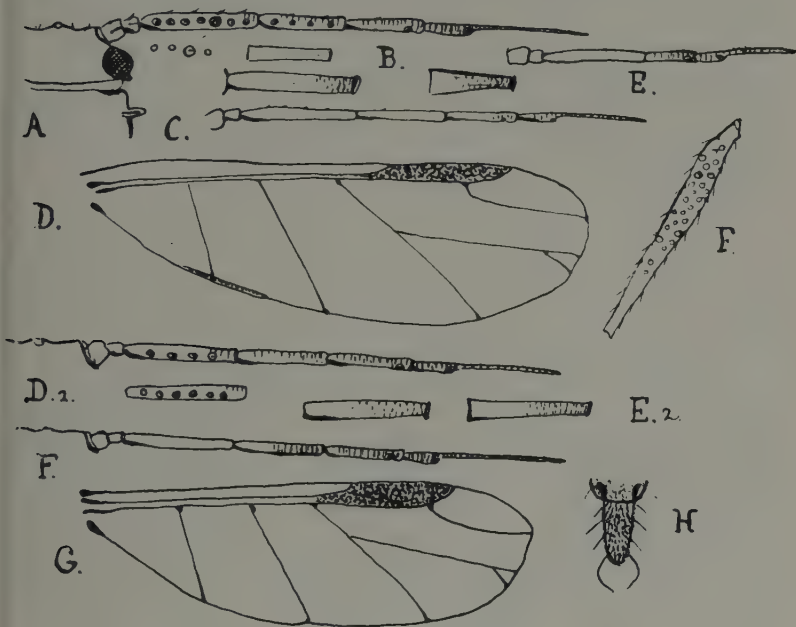


Fig. 79.

A. Head and antenna of *Aphis urticaria*; B. Cornicles; C. Antenna of apterous ♀; D. Wing; E. and F. Antenna and hind tibia of oviparous ♀; D². Head and antenna; E². Cornicles; F. Antenna of apterous ♀; G. Wing; H. Cauda of *Aphis scabiosæ*.

moderately long; apices of femora and more or less the tibiæ dusky; tarsi dark. Segment i. of antennæ wider but no longer than ii.; iii. and v. about equal; v. in some slightly shorter than iv.; vi. with basal area more than half length of v. and more than half flagellum, in many specimens. Cornicles rather longer than antennal segment iii. and thicker, expanded basally; imbricate.

Cauda thicker than cornicles, faintly spinose, with 4 to 5 lateral hairs. Abdomen with 4 lateral pairs of papillæ before the cornicles and a pair between them and the cauda ; a large papilla each side of pronotum.

*Length* 1.7 to 1.9 mm.

*Male.* Apterous. Green to dull brownish-green. Antennæ of 5 segments ; longer than body ; i. broader but no longer than ii. ; iii. long, with 12 to 15 round double contoured sensoria, scattered over whole length ; iv. with 3 to 4 round sensoria as well as the primary one, about half length of iii. ; v. nearly as long as iii. ; flagellum twice as long as basal area. Eyes large, dark. Cauda dusky-green, knob-like and spinose. Penis yellow, long, curved. Legs yellowish-green, rather thick ; apices of tibiæ and the tarsi dark.

*Length* 0.6 mm.

*Oviparous female.* Apterous. Greyish-green to dark bluish-green, some paler and mottled, covered with grey tomentum. Eyes black. Legs pale ochreous-green, apex of tibiæ and the tarsi brownish. Cornicles pale ochreous green, with brown apices. Antennæ dull ochreous ; segments i. and ii. green ; iv. and v. tinged with greenish-brown to deep brown. Antennæ shorter than body, of 5 segments ; i. wider but no longer than ii. ; iii. about as long as v. ; basal area of v. a little shorter than iv. ; flagellum about twice its length. Cornicles cylindrical, expanding slightly at base, about as long as antennal segment iv. ; a little longer than cauda, which is blunt, thick and spinose. Anal plate dark, broad and rounded, with a few hairs. Legs moderately long ; hind tibiæ not much enlarged, with numerous pale round sensoria over its basal three-quarters and with many hairs. Prothoracic and abdominal lateral papillæ present and a few scattered hairs over body.

*Length* 1 to 1.3 mm.

FOOD PLANTS. Nettles (*Urtica dioica* and *U. urens*) ; *Rubus idæus* and *R. fruticosus* are given by Kaltenbach, but this may refer to *A. idæi* of Van der Goot. Buckton records it from Gooseberry and Vegetable Marrow, probably these refer to *A. grossulariæ* and *A. gossypii*.

LOCALITIES. Wye, 25 v. 14 and 21 v. 15 ; Little Hadham, Herts., 7 v. 15 ; Lymington, Hants, 7 vii. 15 ; Rye ; Bodiam and Hastings ; Cambridge, 3 v. 89 ; Aberystwyth, 23 vii. 15, (F.V.T.) ; Great Salkeld, Cumberland, vi. 12 (Britten) ; common around London, Cambridge, Midhurst, Birmingham, Derby (Laing) ; Inveran, Inverness-shire, N.B. (D. J. Jackson) ; Skirwith, Cumberland, 12 vi. 26 (Britten).

*Observations.* This small Aphid swarms on the tops of Stinging Nettles, both on the stalks and leaves and curling the latter, often into a dense tuft. It is largely attended by Ants, including *Formica fusca* ; *Lasius fuliginosus* ; and *Myrmica ruginodis*. The only male I have was sent me by Mr. Rymer Roberts and taken by Miss Haviland. The oviparous females were found by Miss D. Jackson, who found the yellow eggs under the nettle leaves. There is no doubt that Van der Goot's *Aphis idæi* and my *A. parietaria* have been confused with this species.

#### APHIS SCABIOSÆ Schrank.

##### *Psorodaphis* Amyot.

Schrank, Fn. Boica, II., 105, 1882 (1801) ; Kaltenbach, Mono. Pflanz., 60 42, (1843) ; Amyot, Ann. Soc. Ent. Fr., V., 478 ; Walker, List Homop. (B.M.), 1,002 (1852) ; Boyer, Ann. Ent. Soc., Fr. X., 179 (1841) ; Buckton, Mono. Brit. Aphid., II., 55, pl. LIII. (1877) ; Schouteden, Mem. Soc. Ent. Belg., XII., 227 (1906).

*Alate viviparous female.* Head and thorax black, more or less polished. Abdomen green of various shades, in many mottled with pale green. Antennæ somewhat longer or less than the length of the body, dark, almost black ; bases of segments iii. to v. may be paler. Eyes red-brown. Cornicles dark, almost black. Cauda deep green. Leg yellowish ; apices of femora and tibiæ dark ; tarsi black. Wing insertions yellowish ; stigma pale brown ; veins paler brown. Antennal segment i. broader, but no longer than ii. ; both dark ; iii. longer than iv., with 5 to 8 sensoria of somewhat irregular shape ; iv. very slightly longer than v. ; vi. as long as iv. + v., its basal area more than half as long as v. and about one-quarter of the flagellum. Rostrum reaches second coxæ. Cornicles not quite so long as segment iii. of antennæ ; cylindrical, some slightly expanded basally ; markedly imbricate.

Cauda rather more than half as long as the cornicles and nearly twice as wide ; four pairs of lateral hairs. A papilla each side of pronotum and also two small lateral green abdominal papillæ, often difficult to see. Upper fork cell of wings very small.

*Length* 1.5 to 1.9 mm.

*Apterous viviparous female.* Bright to dusky green, some yellow, a few with dark or red spots, now and then almost black. Oval and more or less shiny. Cornicles black, rather long, in some a deep brown. Cauda dark green. Anal plate, deep brown. Legs pale green, apices of tibiæ and the tarsi dark. Antennæ shorter than body, green ; segments i., ii. and vi. dark ; i. wider than ii. ; iii. longer than iv. ; iv. and v. nearly equal ; vi. as long as iv. + v., its basal area half or more of v. ; flagellum a little more than 3 times basal area. Cornicles as long as antennal segment iii., thicker, slightly expanding basally ; imbricate. Cauda paler and broader than cornicles, about half as long, 4 pairs of lateral hairs, basal pair short. Rostrum yellow, apex brown, reaching to or just beyond second coxæ.

*Length* 1.5 to 1.7 mm.

FOOD PLANTS. *Scabiosa arvensis* and *Ballota nigra* ; *Nicotiana rustica* (Forster-Kaltenbach).

LOCALITIES. King's Wood, Wye, 20 vi. 15 (F.V.T.) ; Chester, vi. 26 (Dr. Thomas) ; Norwich ; Carshalton (Buckton).

*Observations.* This species comes very close to *Aphis urticaria* of Kaltenbach. Both Schrank and Kaltenbach record it from *Scabiosa* spp., but Buckton from *Parietaria officinalis* and *Ballota nigra*. Buckton probably confused *Aphis parietaria* Theob. with Schrank's *scabiosæ*. Buckton also says "it attacks Melon Plants in my forcing frames and much weakens the plant," this evidently refers to *Aphis gossypii* Glover. It is not the same as Koch's *Aphis centaureæ* as Buckton suggests, nor do I think the same as Koch's *Aphis chloris* which feeds on *Hypericum perforatum* quite close to the ground. Van der Goot's *Aphis idæi* comes very close to it, but its cornicles are longer and turn outwards. In *urticaria* the cornicles of the apterous female are pale yellow to almost white, in *scabiosæ* they are deep olive-green to deep brown.



## APHIS WILSONI Laing.

Ent. Mo. Mag., LIX., 3rd Se. ix., 239, fig. 1 (1923).

*Apterous viviparous female.* "General colour deep blue-green, slightly pulverulent, highly convex. Head, prothorax, fore part of mesothorax, cornicles, cauda, anal plate, legs and usually a small area posterior to base of cornicles, dark. Proportions of antennal segments 5, 5, 15, 9, 10 (6 + 18); total length 1 to 1.2 mm. Rostrum reaching a little beyond the hind coxæ. Small, inconspicuous lateral tubercles on segments 1 to 4 and 7. Cornicles rather broad at base, tapering towards apex, about twice the length of cauda, which is rather broadly rounded at apex. Total length approximately 2 mm.



Fig. 80.

Antenna of *Aphis wilsoni* Laing. Alate ♀ (after Laing).

*Alate viviparous female.* Of the same general colour as the apterous female. Antennæ with sensoria on segments iii., iv. and v., all large, circular, double ringed, those on iii. and iv. crowded along the whole length of each segment, numerous, v. with about 9; proportions of segments 16, 20, 75, 45, 45 (29 + 77); total length 1.2 mm. Rostrum reaching to hind coxæ. Cornicles nearly three times the length of cauda and longer than segment iv. of the antennæ. Cauda short, broad basally, rounded at tip. Total length approximately 2 mm.

Surrey, Wisley, Royal Horticultural Society's Gardens, on the roots of *Dianthus* (G. Fox-Wilson). Glamorgan on roots of Carnations (Laing).

Near to *Aphis plantaginis* Koch, but the apterous female of *A. wilsoni* has longer and more slender antennæ and cornicles; the antennal spur is longer in proportion to its base than in *A. plantaginis*. The alate female of *A. plantaginis* has secondary sensoria only on segment iii. of the antennæ. Superficially the alate female of *A. wilsoni* is like *A. grossulariæ* Kalt., especially so in the sensoriation of the antennæ, but the shape of the cauda and the inconspicuous lateral papillæ should demark the species." (Laing.)

This species, of which Captain J. Davidson has found males on the lower parts of the stalks of *Dianthus* and which are described in the appendix, seems to me to be nearer *Anuraphis* than *Aphis*.

APHIS APII Theobald.

Journ. Roy. Hort. Soc., L., pt. I., p. 42 (1925).

*Alate viviparous female.* Head and thorax brown ; body green to bright apple green ; cauda, anal plate and cornicles darker. Antennæ shorter than body ; segment i. wider than ii. ; iii. nearly twice as long as iv. and about as long as vi., with 13 to 18 rather small and weakly formed sensoria ; markedly imbricate ; iv. scarcely longer than v. ; vi. with basal area about half v. and about one-third of the flagellum. Cornicles cylindrical, not quite so long as antennal segment v., rather thicker and imbricate. Cauda nearly as long as cornicles to longer and as thick or thicker apically ; apex rounded, spinose and with many long, thin hairs, mostly at apex. Anal plate rounded, spinose, with many hairs. A marked papilla each side of prothorax, a very large papilla between second and third pairs of legs and one between cornicles and cauda ; it is also very hairy. Stigma pale greenish-brown ; veins brown ; second cubital cell rather small, about one-third length of stem.

Length 1.5 to 1.7 mm.

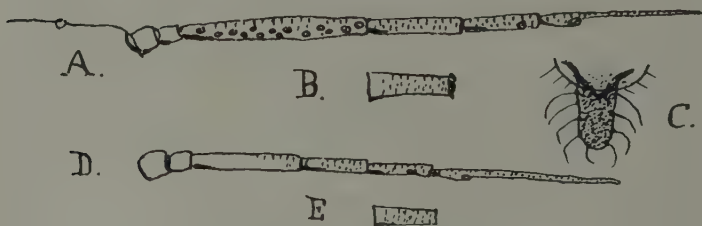


Fig. 81.—*Aphis apii* Theobald.

A. Alate ♀, antenna ; B. Cornicle ; C. Cauda ; D. Antenna ; E. Cornicle of apterous ♀.

*Apterous viviparous female.* Green. Cauda, anal plate, cornicles, apices of antennæ and tibiæ, tarsi and eyes dark. Antennæ slightly shorter than body ; segment i. wider but no longer than ii. and darker ; iii. longer than iv. and shorter than

vi. ; iv. not quite so long as v. ; vi. dark, basal area more than half v. ; flagellum scarcely four times as long as basal area. Head with four long thin hairs ; a few fine ones on the antennæ. Cornicles cylindrical, slightly narrowing towards apices, about as long, but wider than antennal segment v. ; imbricate. Rostrum reaches to third coxæ. A prominent pronotal papilla each side and traces of lateral abdominal papillæ. Body slightly hairy. Tibiæ hairy, especially the hind pair, hairs notably longest on the apical half.

*Length* 1 mm.

*Nymph.* Green, with dusky wing pads. Cornicles and cauda dark. Antennæ and rostrum dark at apices, also apices of the tibiæ. Tarsi dark brown. Antennæ scarcely half length of body ; segment i. broader but scarcely so long as ii. ; iii. longer than iv., but much shorter than vi. ; basal area of vi. about as long as v. and about one-third length of flagellum. Cornicles about as long as, but much thicker than antennal segment v. Cauda shorter and thicker than cornicles, with many lateral hairs.

*Length* 1 to 1.2 mm.

FOOD PLANT. Celery (*Apium graveolens*).

LOCALITIES. Ely ; Little Hadham ; Sidmouth ; Dorchester ; Wye ; Rochester.

*Observations.* Described from specimens sent me in 1903 from Ely, where this Aphis was doing much damage to Celery. It was also seen at Wye in 1907 doing much harm. It clusters on the young and tender leaves and curls them up, but may also be found scattered all over the plant. The record I give of Sidmouth is from a note in an old note book, that the Wild Celery was much infested with a green Aphis in 1889. This may have been Walker's *Aphis inculta* however. The Aphides recorded from *Apium graveolens* are *A. avenæ* Fab., *A. heraclei* Koch, *A. inculta* Wlk. and *Cavariella capreæ* Fab., the latter also from *Apium nodiflorum*. The Aphis described here is not *heraclei* of Koch, found on *Heracleum spondylium*, nor Koch's *A. lappæ*.

Walker's description of *A. inculta* (Zool., VII., App. XLIII.) is as follows :—" The wingless oviparous female—the body is very small, elliptical, green, covered with white powder ; the head,

eyes and antennæ are black and the latter are nearly one half the length of the body ; the tubes are black and not more than one-twentieth of the length of the body ; the tip of the abdomen is black and slightly tapering ; the legs are black ; the thighs, except near their tips, green ; the hind tibiæ are broad. In October, near Fleetwood. On Wild Celery (*Apium graveolens*.)" The very short cornicles seem clearly to point to this being another species from the one described here.

*APHIS EPILOBIARIA* Walker (nom. nud.).

*Alate viviparous female.* Antennæ shorter than body ; segment i. wider but no longer than ii. ; iii. longer than iv., but shorter than vi., with 10 to 16 round unequal sensoria all along the segment ; iv. a little longer than v., with 5 to 8 unequal sized round sensoria ; v. with 1 to 3 sensoria beyond the primary one ; base of vi. about two-third of v. ; flagellum three times as

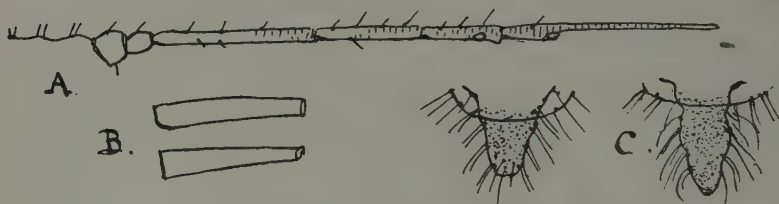


Fig. 82.—*Aphis epilobiaria* Theobald.

A. Head and antenna ; B. Cornicles ; C. Two forms of cauda of apterous ♀.

long as base. Rostrum reaches to about or past second coxæ. Cornicles rather thin, cylindrical, about as long as segment iii. ; imbricate. Cauda long, from three-quarters to more the length of cornicles, with many long lateral hairs. Anal plate rounded and hairy. Tibiæ with many hairs.

*Apterous viviparous female.* Antennæ more than one-half length of body ; segments i. and ii. dark, also apices of iv. and v. and most of vi. ; i. larger than ii. ; iii. longer than iv., about length of flagellum ; iv. slightly longer than v. ; flagellum from 2-2½ length of base of vi. ; a few rather long, stiff outstanding hairs on iii. ; 4 on iv. one apical and larger ; 2-3 on v., apical one large. Eyes large, black ; ocular process large. Rostrum

rather thick, passing second coxæ. Head with several long hairs. Cornicles rather thick and long, swelling towards base, as long as or longer than segment iii. of antennæ; imbricate. Cauda dark, about two-thirds length of cornicles, rather broad, numerous hairs each side, very spinose. Anal plate rounded, with several long hairs. Abdominal papillæ small. Some rather long hairs on body. Legs moderately long, rather thick; a few hairs on femora and many spine-like ones on tibiæ; apices of tibiæ somewhat bent inwards.

*Length* 2 mm.

FOOD PLANT. *Epilobium angustifolium*.

LOCALITY. Southgate, 19 viii. 47 (Walker).

*Observations.* A slide in the National Museum, Dublin, and in the Brit. Mus., Nat. Hist. and Hope Museum, Oxford, of Walker's, bears his label naming it *epilobiaria*. I cannot find that he described any such species. It seems to me to be quite distinct so I have described its chief characters. It cannot be his *epilobiina* for the cornicles are more than one-eighth of the length of the body. The species is probably green in the apterous female and the alate female with dark thoracic lobes, judging from the old slides.

APHIS NEORETICULATA nom. nov.

*Aphis reticulata* Theob. (non Wilson, 1915).

Rept. Lanc. and Ches. Ent. Soc., 1921-1922 (1922).

*Apterous viviparous female.* Described from spirit specimens. Colour apparently dark; head and pronotum darker; 3 dark bars behind cornicles and dark patches on body; venter paler, with a large dark plate near cauda and some anterior dark dorsal transverse bars. Antennæ dark. Cornicles and cauda very dark. Legs dark. Antennæ about half length of body, very thin; segment i. much wider than ii., black; iii. a little longer than iv., a little shorter than vi.; iv. a little longer than v.; basal area of vi. rather long. Rostrum rather thick, dark, reaching past second coxæ. Cornicles thick, rather long, as long as segment iii. of antennæ; cylindrical, slightly expanding basally, imbricate.

Cauda prominent, about three-quarters length of cornicles, bluntly acuminate, with a few rather stiff hairs. Anal plate fairly large with several hairs. Legs moderately long and rather thick; some outstanding hairs on femora and tibiæ; coxæ and

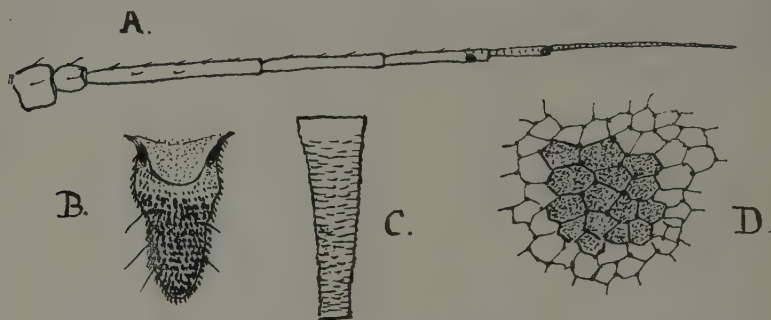


Fig. 83.—*Aphis neoreticulata* nom. nov.

A. Antenna; B. Cauda; C. Cornicle; D. Cuticle of apterous ♀.

femora black; tibiæ paler, except at apices, notably on hind legs. Cuticle marked with rather large and prominent hexagonal or irregular reticulation, most noticeable on the dark pigmented areas, this reticulation narrows on the thoracic region.

Length 3.0 to 3.5 mm.

FOOD PLANT. Globe Artichoke (*Cynara cynosbatella*).

LOCALITY. Bangor, North Wales, 9 vi. 21 (C. L. Walton).

Observations. A very marked, rather large species, with very narrow antennæ and marked reticulation of the cuticle.

APHIS SANGUISORBÆ Schrank.

Schrank, Fn. Boica, II., 106 (1801).

*Apterous viviparous female.* Brown to deep greenish-brown, some inclining to black. Antennæ green, apex and base dark. Legs green; apices of tibiæ and the tarsi dark. Cornicles, cauda and anal plate black. Antennæ not half length of body; segment i. larger than ii., both very dark; iii. longer than iv. and shorter than vi., about equal in length to the flagellum; iv. about as long as v.; vi. with flagellum about four times as long as base. Cornicles rather short, about as long as antennal segment v.,



cylindrical, slightly expanding basally, imbricated. Cauda not quite so long as cornicles, wider and bluntly pointed, widened at base, 3 hairs one side, 2 the other. Anal plate rounded, with several long hairs. Legs rather short, with many short, scattered pale hairs on tibiæ. Rostrum reaches to second coxæ.

*Length* 1.5 mm.

FOOD PLANT. Wild Burnett (*Sanguisorba officinalis*).

LOCALITY. Wye, 12 vi. 21.

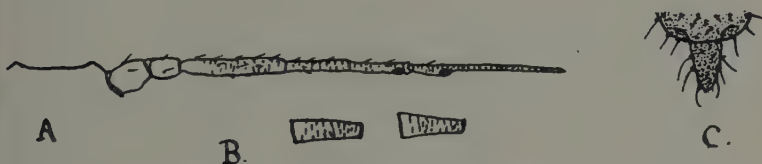


Fig. 84.—*Aphis sanguisorbiæ* Schrank.

A. Head and antenna; B. Cornicles; C. Cauda and anal plate of apterous ♀.

*Observations.* A few scattered specimens of the apterous female found in the flower heads and on the stalks of the Wild Burnett in company with *Myzus sanguisorbiella* Theob. I think this must be Schrank's species. The original description is as follows:—"Wohnort; an den Stengeln des officinellen Wiesenknopfes. Amn. Eyförmig, glatt, schattenbraun auch schwarz; der Brusstrücken nach der Quere galtir; am Hinterleibe längs beyder Seiten eine Reihe eingegrabener Punkte; das Afterschwänzchen kürzer als die Saftspizen; die Fühlhörner nicht einmal von der halben Leibeslänge. Die Fühlerhörner bald, nebst den Füßen farbelos, bald den Spizen schattenbraun, bald durchaus, nebst den Füßen, schattenbraun."

APHIS LOTI Kaltenbach.

Kaltenbach, Die Pflanzen-Feinde, 131, 29 (1874). Schouteden, Mém. Soc. Ent. Belg., XII., 222 (1906).

*Apterous viviparous female.* Black, shiny above, dull below, rounded. Antennæ white, black at base and apex. Cornicles black, also cauda and anal plate. Legs pale, almost white or creamy, apices of femora, tibiæ and all the tarsi black. Rostrum pale at base, apex black. Antennæ shorter than body; segments

i. and ii. black ; i. larger than ii. ; iii. longer than iv. ; iv. a little longer than v. ; vi. dark, not quite so long as iii. ; flagellum rather more than three times as long as base. Rostrum reaches second coxæ. Cornicles rather thick, cylindrical, about as long as antennal segment iv., imbricate, edges serrate. Cauda prominent, black, thick, half to less the length of cornicles ; 3 hairs each side. Anal plate rounded, with a few hairs. Tibiæ hairs pallid.

*Length* 1.5 to 1.9 mm.

FOOD PLANT. Birds-foot Trefoil (*Lotus corniculatus*).

LOCALITIES. Wye, v. 10 and vi. 12 ; Hastings, near Bulverhythe, vi. 13 ; Ecclesbourne Glen, Hastings, v. 11 (F.V.T.) ; Aberystwyth, vi. 20 (C. L. Walton) ; Germany (Kaltenbach).

*Observations.* A dark species, with very prominent black segments i., ii. and vi. to the white antennæ. It occurs in small numbers amongst the flower heads of the Birds-foot Trefoil. I found nymphæ in May at Wye, but the alatæ had flown before I visited the colonies again.

Kaltenbach's original description is as follows :—" *Aphis loti*, m. Mitte Mai, 1858, fand ich dieselbe an einem gegen Süden abfallenden Damm in mehreren, ziemlich zahlreichen Gesellschaften auf dem Schotenklee. Einzelne überwinterte (?) flugellose Mütter sassen zwischen ihren noch unentwickelten Töchtern. Stammütter eirund, hoch aufgetrieben, oberseits glänzend, unten matt schwarz. Fühler viel kürzer als der Leib, weiss, erstes und die beiden Endglieder schwarz, Saugrüssel schwarz, bis zur Einlenkung des mittlern Beinpaars reichend. Augen schwarz ; die 3 Bruststringe deutlich gesondert. Safröhren aufgerichtet, mässig lang, doch nur wenig das Schwänzchen überragend, nach der Spitze zu etwas verjüngt. Beine weiss ; alle Tarsen, die ausserste Spitze der Schienen und Schenkel bis auf die kleinere Wurzelhälfte schwarz. Die Zucht geflügelter Mütter misslang mir."

APHIS CALLUNÆ Theobald.

Entomologist, XLVIII., 258 (1915).

*Apterous viviparous female.* Black, marked with a fine mealy white hexagonal sculpturing, which is most characteristic under a

two-third power, appearing as a pruinose mealy coating under a Coddington lens ; 5 pairs of more or less prominent dark lateral spots, due to the absence of the mealy coating. Cauda black, prominent, coated with farinose matter. Legs and antennæ black. Venter dull greenish-brown, very mealy. Cornicles short, thick and black. On immersion in alcohol all the beautiful mealy markings go and the insect becomes a deep reddish-brown. Antennæ shorter than body ; segment i. wider but scarcely longer than ii. ; iii. a little longer than iv. ; iv. and v. about equal ; vi. the longest, flagellum rather more than twice base. Rostrum reaches to second coxæ, acuminate, apex dark. Cornicles black, short, rather thick, about same length as cauda or slightly longer, imbricate. Anal plate black. A small papilla each side of pronotum and another just behind posterior legs. Abdomen with a few short hairs, some showing slight apical enlargement. Head flattened in front, 2 median frontal hairs, slightly capitate. Body surface shows more or less clearly hexagonal or polygonal sculpturing, answering to the white sculpturing shown when alive. Tibiæ with moderately long hairs.

*Length* 1 mm.

FOOD PLANT. Heather (*Calluna vulgaris*).

LOCALITY. Brockenhurst, New Forest, 20 viii. 1915.

*Observations.* Described from a single colony found inside the flowers and on the flower heads of heather in the New Forest. The young are greenish with black legs and antennæ, a few were pale plum colour. It is a very marked and beautiful species when alive in the adult apterous stage. It appears to be rare for I have frequently searched for it since on both *Calluna* and *Erica*. The only record I know of an Aphid on *Ericaceæ* is the species described by Walker from Hardy's MSS., as *Aphis ericæ* (List. Hom., B.M., IV., 1038, No. 307, 1852). This is "a small, grass-green, shining, flask-shaped aphid, convex above, very slightly granulose ; legs testaceous ; antennæ dusky, longer than the body, the first and second segments greenish, third long, fifth shorter than fourth. Length  $\frac{3}{4}$  line. Found in Scotland." Clearly quite a distinct insect from the one described here.

## APHIS TORMENTILLÆ Passerini.

Bull. Soc. Ent. Ital., XI., 48 (1879).

*Apterous viviparous female.* Oval ; small ; fuscous, in some black above, paler and mottled beneath ; antennæ dusky ochreous, base black ; apex dark ; legs ochreous, apices of tibiæ and tarsi dark and in some apices of femora. Cornicles and cauda black. Antennæ short, a little more than half the length of the body of 5 segments ; segment i. much larger than ii. ; iii. the longest, not quite so long as v. ; iv. about one-third of iii. ; base of v. about one-third of iv. ; flagellum nearly as long as iii. Cornicles short, rather thick, about as long as segment iv. ; imbricate. Cauda as long as the cornicles, thicker and blunt, with 4 curved hairs each side. Prothorax with a small papilla each side ; abdomen with one small pair of papillæ and one large pair, caudad. A few hairs on the head and several on the anal plate. Legs moderately long, the tibiæ, especially of the hind pair, with many hairs. A few short hairs on body.

*Length* 1 to 1.2 mm.

FOOD PLANTS. *Potentilla palustris* and *Tormentilla erecta*.

LOCALITIES. Rhos-y-Domen, Llansannan, Wales, 9 viii. 26 (Dallman) ; Italy (Passerini).

*Observations.* Re-described from a few apteræ and larvæ taken by Mr. Dallman. I do not know of its record since Passerini described it. It is a small oval black species, with markedly thick cauda as long as the cornicles.

## APHIS ALIENUS Theobald.

Theobald, Ent. Record, XXVII., 3, 54 (1915).

*Apterous viviparous female.* Bright emerald green. Eyes dark. Antennæ shorter than body, of 6 segments ; v. dusky at apex and all vi. ; i. broader and slightly longer than ii. ; iii. longer than iv., not quite so long as vi. ; iv. and v. about equal ; base of vi. about as long as v. ; flagellum about twice as long as base of vi. ; segments i. and ii. slightly darker than iii. and base of iv. ; a few scattered hairs on segments iii. to vi. Rostrum dark at base and apex, reaching to third coxæ. A blunt papilla each side of the

pronotum. Abdomen with one marked lateral blunt papilla on each side, between second and third legs and another between the cornicles and cauda. Cornicles rather short, black, thick, expanding basally, marked with dotted lines, more than normal imbrications; about as long as cauda, which is dusky at apex. Legs moderately long, especially hind pair; tarsi and apices of tibiæ dusky; a few hairs on apices of femora; tibiæ with many hairs. Cauda and anal plate spinose, with a few hairs.

*Length* 1.3 to 1.9 mm.

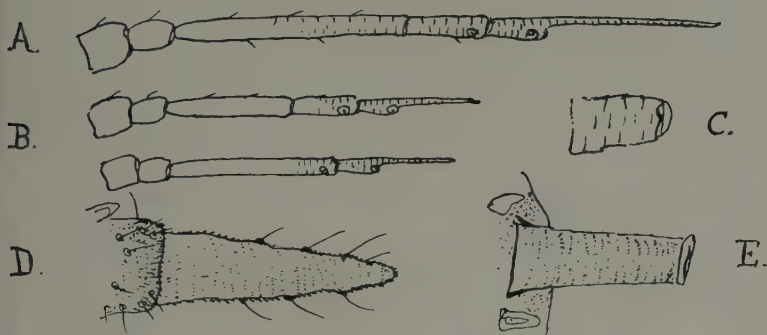


Fig. 85.—*Aphis alienus* Theobald.

A. Antenna of apterous ♀ (5-segmented form); B. of larvæ; D. Cauda; E. Cornicle; C. Cornicle of larva.

**LOCALITIES.** Seaton, South Devon, 2 viii. 12; Whitsand Bay, Cornwall (Donisthorpe); Wye, 7 ix. 19; Lymington, Hants., 14 viii. 15 (F.V.T.).

**FOOD PLANTS.** Roots of various small plants, as *Lamium*, *Tussilago*, *Graminaceæ*.

**Observations.** This insect was first sent me by Mr. H. Donisthorpe, the specimens having been found in the nests of Ants—*Lasius alienis* and in consequence I named it *alienis* owing to its close connection with that ant. Since then I have found it on various roots quite unattended by any ants. Some errors made in my original description are rectified here. All the apterous stages except very young larvæ have the antennæ of 6 segments, rarely one may have 5. No alatae have yet been found.

## APHIS DALLMANI Theobald.

Ent. Mo. Mag., LX., 3rd Se., p. 129, fig. 7 (1924).

*Alate viviparous female.* Head and thorax black; abdomen green to yellowish-green above, with three brown median transverse bars, brown lateral spots and four pairs of narrow black submedian marks. Antennæ and cornicles black. Cauda green to yellow-green. Legs green to yellow-green, apical half of femora and tibiæ black; tarsi black. Venter green; sternal plate black, a black spot at apex of body. Wing insertions same colour as body; stigma and veins deep grey to almost brown. Antennæ longer than body; segment i. larger than ii.; iii. much longer than iv., not so long as flagellum of vi., with 18 to 20 round sensoria on one side, reaching nearly to apex, of unequal size; iv. and v.

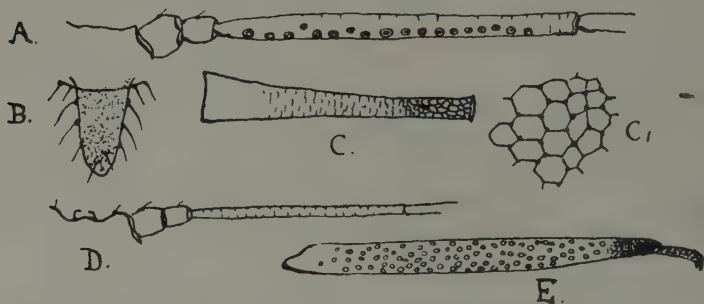


Fig. 86.—*Aphis dallmani* Theobald.

A. Basal area of antenna; B. Cauda; C. Cornicle; C1. Apical reticulation of alate ♀; D. Head and base of antenna of oviparous ♀; E. Hind tibia.

about equal length; vi. with basal area rather less than v. Rostrum rather short and thick, scarcely reaching to second coxæ. Head with very small lateral lobes, in some not showing at all. The dark cornicles are rather thick and long, not quite so long as antennal segment iii., base somewhat enlarged and in some the cylindrical form is irregular; apices reticulate, remainder imbricated. Cauda about quarter length of cornicles, finely spinose; three hairs each side and one or two sub-apical. Tibiæ with numerous short hairs.

*Length* 1.7 to 2.1 mm.



*Apterous oviparous female.* Yellow to citron-yellow ; cornicles black in some, pale in others ; small black specks each side of body ; cauda yellow ; antennæ dusky at apices of segments iii., iv. and v. and all vi. ; in some v. is mostly dark. Legs same colour as body, except apices of tibiæ and the tarsi which are dark. Antennæ a little longer than body ; segment i. larger than ii. ; iii. longer than iv. ; but not so long as flagellum of vi. ; iv. and v. about equal. Rostrum broad, reaching to or just past second coxæ. Cornicles about as long as segment iii. of antennæ, reticulate at apices, reticulations large, rest imbricated. The pale cauda is broad and thick, less than half the cornicles, spinose with several hairs on each side. Hind tibiæ swollen, with numerous round sensoria over whole length, except at the black apical area, with numerous short hairs.

FOOD PLANT. *Agrimonia eupatoria*.

LOCALITY. Rossington Bridge, near Doncaster, x. 23 (A. Dallman).

*Observations.* In general appearance this insect resembles a *Macroriphum*, but the frontal lobes are not as in that genus, the head approaching *Aphis* in type, especially in the alata. The oviparous females show more marked lateral cephalic lobes and usually three ova within. Both forms occurred in great numbers on and under the leaves, which were ripening at the time Mr. Dallman collected them. The alata kept on appearing into November, but I was unable to obtain any males. It is possible that this should be placed in a new genus.

APHIS COMPOSITELLÆ Theobald.

Ent. Mo. Mag., LX., 3rd Se., p. 126, fig. 4 (1924).

*Alate viviparous female.* Green to yellowish-green. Head and thorax black. Abdomen with black markings. Cornicles and cauda black. Antennæ deep olive-green to almost black. Legs green to yellowish-green, apices of femora and tibiæ black ; tarsi black. Antennæ about as long as body ; segment i. wider but no longer than ii. ; iii. about twice as long as iv. and about as long as vi., with 26 to 30 marked sensoria over whole length ; iv. about as long as v. with 9 to 12 sensoria, on one side up to

apex; v. with 1 to 3 sensoria and the normal sub-apical one; vi. with basal area small, flagellum nearly as long as iv. + v.; iii. with several hairs; iv. and v. with two each side; vi. with three small hairs one side and one on opposite side on basal area; the sensoria give a marked tuberculate appearance. Rostrum reaching nearly to third coxæ. Small prothoracic lateral tubercles. Cornicles rather thick and cylindrical, less than length of antennal segment v.; imbricated. Cauda not quite so long as the cornicles, very spinose, with several fine hairs; projecting

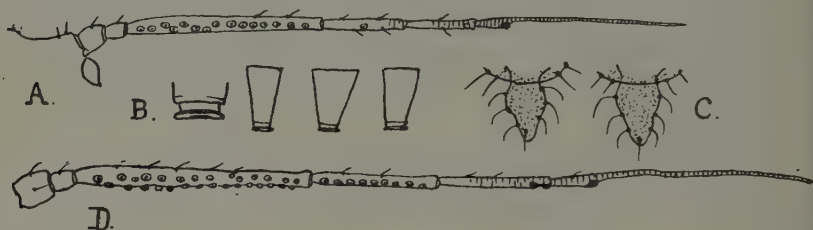


Fig. 87.—*Aphis compositellae* Theobald.

A. B. C. Head, antenna, cornicles and cauda of apterous ♀; D. antenna of alate ♀.

well beyond the cornicles. Anal plate very spinose. Legs normal; tibiæ with many short hairs. A few hairs on abdomen, which shows marked dark lateral spots. Wings normal.

Length 2.2 to 2.5 mm.

*Apterous viviparous female.* Green to yellow. Head black. A black pronotal band, a second black bar caudad. Cornicles black, in most a pale spot at their base. Cauda black. Antennæ black, shorter than body. Legs same colour as body, apices of femora and tibiæ black; tarsi black. Segment i. of antennæ much larger than ii.; iii. much longer than iv., but much shorter than vi. with 14 to 18 sensoria along one side of whole length; iv. slightly longer than v. with 0 to 1 sensoria, two hairs each side; v. with normal sub-apical sensorium, one to two hairs one side, one the other; vi. with basal area not half v.; flagellum longer than iv. + v. Rostrum reaching to third coxæ. Cornicles thick, cylindrical, broadened basally, about as long as antennal segment iv., much thicker, imbricated. Cauda not quite so long as cornicles about as thick, very spinose, with three hairs each side and one

median dorsal one near apex. Anal plate very spinose, with long and short hairs. Cauda projecting well beyond cornicles. Head and body with scanty hairs. Pronotal papillæ small; none on body. Femora and tibiæ with hairs.

*Length* 2.1 to 2.5 mm.

FOOD PLANTS. *Sonchus* *sp.* and another Composite.

LOCALITIES. Newborough, Anglesey, viii. 23; Bangor, viii. 23 (C. L. Walton).

*Observations.* Described from a number of apteræ and a few alataæ. It is a very marked species, easily told by the many sensoria on antennal segment iii. in the apteræ. The alate female antennæ are markedly tuberculate and the cauda much projecting beyond the cornicles. The markings on the apteræ are also very characteristic. I could not identify the species of *Sonchus*, nor the other Composite it was found upon by Mr. Walton.

#### APHIS TRIGLOCHINIS Theobald.

Ent. Mo. Mag., LXII., 162, fig. 1 (1926).

*Apterous viviparous female.* Rich shiny green to shiny brownish-green; cornicles, cauda, antennæ and most of legs dark. Antennal segment i. larger than ii.; iii. longer than iv. and a little longer than vi., with 25 to 28 sensoria over whole length; iv. longer than v. with 10 to 14 sensoria scattered over it; v. with

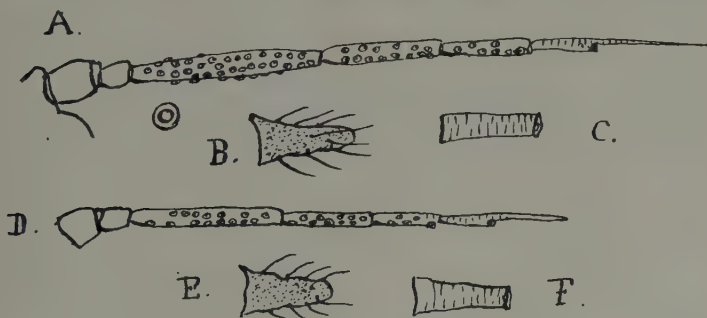


Fig. 88.—*Aphis triglochinis* Theobald.

A. B. and C. Antenna, cauda and cornicle of alate ♀; D. E. and F. of apterous ♀.

3 to 6 small sensoria + 1 primary; base of vi. more than half flagellum. Cornicles rather short and thick, strongly imbricate, cylindrical, somewhat expanding basally. Cauda two-thirds of cornicles and a little thicker; 3 hairs each side and 1 apical. Legs moderately long, with many hairs; most of tibiæ deep green.

*Length* 1.3 to 1.7 mm.

*Alate viviparous female.* Head and thorax black; abdomen rich deep very shiny green, swollen. Antennæ, cornicles and cauda black. Legs dark, except basal two-thirds of tibiæ. Abdomen with small lateral papillæ. Antennæ shorter than body; segment i. larger than ii.; iii. longer than iv. and about as long as vi.; iii. with 36 to 45 sensoria all over it; iv. with 16 to 18; v. with 7 to 10 + 1; base of vi. more than half flagellum. Cornicles cylindrical, slightly broadening at bases, markedly imbricate, rather thick. Cauda thick, two-thirds to more length of cornicles, 3 hairs each side and 2 dorso-apical ones. Wings with pale yellowish-green veins.

*Length* 1.5 to 2 mm.

FOOD PLANT. Sea Arrow Grass (*Triglochin maritimum*).

LOCALITY. Seasalter, 2 vii. 25, 7 viii. 26.

*Observations.* Great numbers found densely clustering up the flowers and seed heads of the Arrow Grass in 1925. I found it on two plants only, alatæ, apteræ and nymphæ all packed together, but in 1926 it occurred in vast masses. Both alatæ and apteræ have a very swollen, shiny appearance. A few apteræ show no signs of antennal secondary sensoria, but are undoubtedly the same species. About 10 per cent. were parasitised. It comes near *compositellæ* Theobald but the adults show no black markings and the antennal sensoria, especially on segment v. are different.

APHIS PSEUDOHEDERÆ sp. nov.

*Apterous viviparous female.* When mounted somewhat like *A. hederæ* (Kaltenbach) but may be easily demarked by the following characters. Antennæ a little more than half length of body. Segment i. much wider but no longer than ii.; iii. longer than iv., with 8 to 13 sensoria on one side, some larger than others;

iv. about as long as v., sensoria 0 to 2 (on mid area); v. with 0 + 1, sometimes showing a small one just below the primary; basal area of vi. half of v. Cornicles dark, cylindrical, expanded

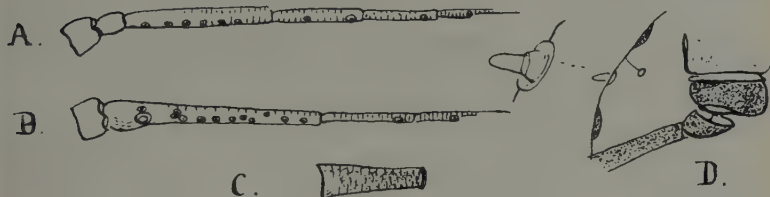


Fig. 89.—*Aphis pseudohederae* sp. nov.

A. Normal antenna of apterous ♀; B. Abnormal antenna; C. Cornicle; D. Third coxa and lateral papilla.

at bases, imbricate, shorter than antennal segment iii. and longer than cauda. Cauda black, with a few hairs. Anal plate dark, broad, many long hairs. Abdomen with a prominent papilla each side at level of third coxæ. Scattered hairs on body, longest on apical region and with small dark, lateral spots and traces of 2 dark bars, posteriorly. Coxæ dark and also femora of mid and hind legs; apices of tibiæ and tarsi dark.

Length 2 mm.

FOOD PLANT. Ivy (*Hedera helix*).

LOCALITY. Bangor, North Wales, xi. 21 (C. L. Walton).

*Observations.* Described from specimens that had been mounted before any colour notes had been taken. It was found in company with *Aphis hederæ* Kalt. and *Anuraphis angelicæ* Koch and *Rhopalosiphoninus waltoni* Theob. It is a marked species and can at once be told by the sensoria on the antennæ and the marked papilla on the level of third legs.

#### APHIS NEWTONI Theobald.

Ent. Mo. Mag., lxiii, 31, fig. 5 (1927).

*Alate viviparous female.* Head and thorax black; a pale band between head and thorax; abdomen green with 4 pairs of black lateral spots, a dark patch at base of cornicles, a dark bar

(irregular) between and two dark bars caudad. Antennæ, cornicles and cauda dark ; legs same colour as body, mid and hind femora dark and apices of tibiæ and the tarsi ; venter green with a dark bar caudad ; a large papilla each side of pronotum and 5 pairs of prominent ones on abdomen, the first and last largest. Antennæ shorter than body ; i. wider than ii. ; iii. a little longer than iv. with 9 to 16 round, unequal sized sensoria ; iv. a little longer than v. with 3 to 7 sensoria ; v. with only the primary ; base of vi. about half of v. ; flagellum longer than iii. ; iii. to vi. imbricate. Rostrum reaches to or just past second coxæ. Cornicles cylindrical, not so long as antennal segment iv., scarcely longer than base of vi., imbricate. Cauda not quite so long as cornicles with several rather long curved hairs. Femora and tibiæ with many hairs.

Length 2 mm.

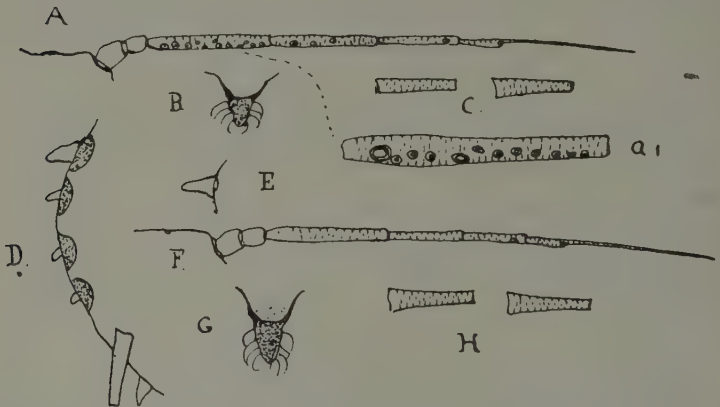


Fig. 90.—*Aphis newtoni* Theobald.

A. Head and antenna of alate ♀ ; A1. Antennal segment 3 further enlarged ; B. Cauda ; C. Cornicles ; D. Lateral abdominal papillæ of apterous ♀ ; F. Head and antenna of apterous ♀ ; G. and H. Cauda and cornicles.

*Apterous viviparous female.* Deep green and rich bright green ; head, band on thorax darkened, also some lateral spots, two pairs of spots between mid and hind legs, often almost forming bars, two lines of spots behind them and some scattered small dark spots, the body markings except the lateral spots very variable in size, sometimes nearly absent. Cornicles, cauda and anal



plate dark. Antennæ same colour as body except at base and apex. Legs same colour as body, but the mid and hind femora dark; apices of all tibiæ and the tarsi dark. A large dusky papilla each side of pronotum and 5 pairs on body, first and fifth the largest. Antennæ moderately long, but shorter than body; i. larger than ii., both dark; iii. much larger than iv., much shorter than flagellum of vi.; iv. and v. about equal; base of vi. rather more than half of v. flagellum long, nearly as long as iii. + iv. Rostrum broad, reaching to or just past second coxæ, in some shorter. Cornicles cylindrical, expanding basally, about as long as segment iv.; imbricate. Cauda not so long as cornicles, broader and bluntly acuminate, with several curved hairs. Venter green with a dark bar and large dark patch caudad. Femora and tibiæ with many hairs. Coxæ markedly dark.

*Length* 1.7 to 2 mm.

FOOD PLANT. Yellow Iris (*Iris pseudacorus*).

LOCALITY. Dungeness, near Lydd, 1 viii. 26.

*Observations.* Found by Mr. F. Newton on some Yellow Iris growing in a small depression on the shingle at Dungeness, near Lydd; the dense colonies of apteræ and nymphæ occurred low down on the blades close to the damp soil. Alatæ hatched out readily soon after the colonies were collected and continued to do so until the end of the second week in August. Both alatæ and apteræ and the nymphæ have very large lateral tubercles and the relative length of the antennal segments vary, especially in the apteræ, even on the two antennæ of one specimen. The dark abdominal patches also vary in size, number and intensity.

APHIS RHAMNI Boyer.

*Aphis rhamni* Koch.

*Aphis abbreviata* Patch.

Boyer, Ann. Soc. Ent. Fr. x. 177 (1841); Koch, Die Pflanz, 119, figs. 161, 162 (1854); Patch, Maine Agri. Exp. Sta. Entomo., No. 202, 170 (1912); Bull. 317, Maine Agri. Exp. Sta., April (1924).

*Alate viviparous female.* Green; head and thoracic lobes black; a green band on pronotum or all green; black lateral

abdominal spots; black cauda and cornicles; antennæ deep brown, base of iii. paler; legs yellowish-green, apices of femora and tibiæ dark and the tarsi. Eyes black. Antennæ shorter than body; segment i. a little wider than ii.; iii. longer than iv., about as long as flagellum, with 10 to 14 round sensoria mainly along one side up to apex; iv. equal to v. or a little longer, with 3 to 6 sensoria; v. with 1 to 3 + 1 and not quite twice base of vi.; flagellum three times base. Rostrum to second coxæ. Cornicles not quite to about as long as antennal segment v.; cylindrical and imbricate, variable in length; cauda acuminate, not quite] so long as cornicles, with a few long pale curved hairs. Abdominal lateral papillæ pale, small; each segment with a few median

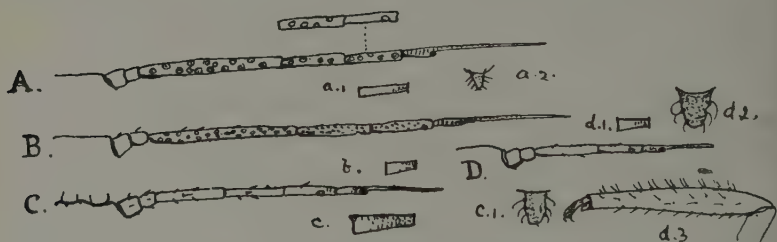


Fig. 91.—*Aphis rhamni* Boyer.

A. Antenna of alate ♀; a.1. Cornicle; a.2. Cauda; B. Antenna of alate ♂; b. Cornicle; C. Antenna of apterous ♀; c. Cornicle; c.1. Cauda; D. Antenna of oviparous ♀; d.1., d.2. and d.3. Cornicle, cauda and hind tibia.

irregular row of short hairs; three large spots each side and a dark patch at base of cornicles caudad, a dark area between cornicles and cauda and some small dusky glandular areas on body. Wings and legs normal.

Length 1.4 to 1.7 mm.

*Apterous viviparous female.* Pale green to pale yellowish-green with some deeper green lines; antennæ same colour as body, apices dusky; cornicles and cauda green or yellow-green, in some the cornicles slightly dusky at apices; legs same colour as body, apices of femora and the tarsi dusky. Antennæ shorter than body; i. larger than ii.; iii. a little longer than iv., but now and then equal to it; iv. slightly longer than v., now and then equal to it, so that iii., iv. and v. are sometimes equal; flagellum about

two and a half times base ; segments with a few short hairs. Rostrum reaches to between second and third coxæ, sometimes to the third. Cornicles cylindrical, about as long as antennal segment iii., rather thick. Cauda rather thick and blunt, a little more than half cornicles, 3 hairs each side and 1 or 2 dorso-apical ones. Lateral abdominal papillæ small. A few hairs on body. Legs with many spine like hairs on tibiæ.

*Length* 1 to 1.2 mm.

*Male.* Alate. Head and thorax black ; abdomen green or dirty brownish-yellow and black. Antennæ dark ; legs green to yellow, apices of femora, tibiæ and the tarsi dark. Cornicles black. Cauda deep greenish-brown. Antennal segment iii. with 33 to 38 sensoria over whole length ; iv. with 17 to 19 ; v. with 6 to 8 ; iii. nearly as long as iv. and nearly equal to vi. ; iv. and v. equal or iv. a little longer than v. ; base of vi. about one-third of flagellum and half of v. Cornicles rather short, about equal to base of vi. Claspers black ; penis pallid.

*Length* 1.3 to 1.5 mm.

*Oviparous female.* Apterous. Yellow to green ; apices of antennæ, cornicles and the cauda dusky to deep brown. Antennæ of 5 segments, not quite half length of body ; segment i. longer than ii. ; iii. nearly as long as v. ; iv. more than half of iii. ; base of v. not quite so long as iv. ; flagellum one and a half length of basal area. Rostrum pale, rather thick, reaching to second coxæ. Legs rather thick, especially the hind pair ; hind tibiæ swollen, with many pale sensoria. Cornicles short, cylindrical, about equal to length of antennal segment iv. The pale cauda short, thick and blunt, about as long as cornicles. Each female shows one or two large eggs inside.

*Length* 1 to 1.4 mm.

FOOD PLANTS. Buckthorns (*Rhamnus catharticus* and *R. frangulæ*) and many other plants in America.

LOCALITIES. Ashern, West Riding, Yorks., x. 23 (Dallman) ; King's Wood, near Wye, 8 vii. 26 (F.V.T.) ; Ballyspinnen, Ireland, 18 x. 25 (Stelfox) ; Brussels (Schouteden) ; America (Patch).

*Observations.* A marked species which curls up the leaves at the tips of the shoots ; the bright green or yellowish-green apteræ

with *pale* cornicles and cauda at once demark it from the other *Rhamnus* Aphis. It quite covered the tips of an isolated Buckthorn in King's Wood in 1926, a few of Kaltenbach's darker *Aphis frangulæ* occurring with it. I feel sure that Miss Patch's *abbreviata* is the same. The relative lengths of the antennal segments vary very much even in a single colony from one shoot and also the cornicles and cauda. With us it occurs on the Buckthorns in May, June and July, and then the alatae fly away. The secondary host plants are not known with us, but Miss Patch records many in America, including:—*Chenopodium*; *Alisma*; *Beta*; *Stellaria*; *Berberis*; *Brassica oleracea*; *Oxalis*; *Fragaria*; *Impatiens*; *Malva*; *Viola*; *Pastinaca*; *Galeopsis*; *Plantago*; etc., etc.

The sexuales occur on the Buckthorn in October and November and the eggs are laid in axils of the buds.

#### APHIS FRANGULÆ Kaltenbach.

##### *Aphis frangulæ* Koch.

Kaltenbach, Mono. Pflanz., 64, 45 (1843); Die Pflanzen-Feinde, 101 (1874); Koch, Die Pflanz, Aphid, 142, figs. 192, 193 (1855); Schouteden, Aphid. Belg., 226, 52 (1906).

*Apterous viviparous female.* Blackish-green, with several deeper green or black lines; antennæ yellow, segments i. and ii. dark also vi. Cornicles and cauda black. Legs yellow. Eyes deep brown. Antennæ not quite so long as body; i. wider than ii.; iii. a little longer than iv., and a little shorter than vi.; iv. a little longer than v.; base of vi. more than half of v., flagellum as long as iii. and not quite three times length of base. Cornicles

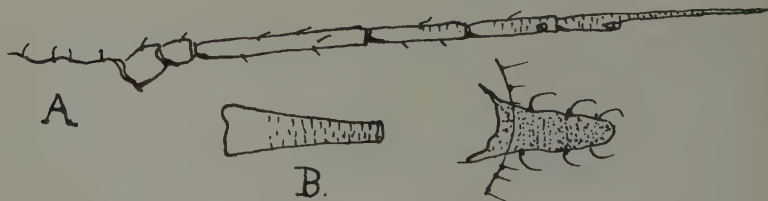


Fig. 92.—*Aphis frangulæ* Kaltenbach.

Apterous ♀; A. Head and antenna; B. Cornicle; C. Cauda.

cylindrical, about as long as iv., slightly expanding basally. Cauda not quite so long as cornicles, a few hairs each side. Rostrum reaches to second coxæ. A few hairs on femora and tibiæ.

*Length* 1.7 to 2 mm.

*Alate viviparous female.* Head and thorax black; abdomen dark green and black; antennæ dark at base and apex, middle yellowish, shorter than body. Rostrum to second coxæ, yellow, apex brown. Cornicles rather long, deep brown. Cauda green to brown, about half of cornicles. Legs dusky yellow, apices of femora and tibiæ and the tarsi dark.

FOOD PLANTS. *Rhamnus catharticus* and *R. frangulæ*.

LOCALITIES. King's Wood, Wye, vii. 26 (F.V.T.); Germany (Kaltenbach, Koch).

*Observations.* I have only found this species once and then only apteræ. Kaltenbach records it in May and June. The apteræ can at once be told from the other *Aphis* on *Rhamnus* by the dark colour and dark cornicles and by its larger size. The few apteræ I found were living in the curled up leaves.

APHIS BREVISIPHONA Theobald.

Journ. Bd. Agri. XIX., 919 (1913).

*Apterous viviparous female.* Very dark green to almost black, cauda, cornicles, and apices of antennæ black. Antennæ shorter than the body; segments i. and ii. dark, equal in length, i. wider than ii.; iii. longer than iv., about equal to flagellum; iv. and v. about equal; base of iv. more than half of v. Rostrum reaches just past the second coxæ. Cornicles rather short and thick, equal to segment iv. of the antennæ, markedly imbricate. Cauda as long as or longer than the cornicles, with five pale curved hairs each side. Apices of femora and tibiæ dark, especially femora of hind leg. Pronotal papillæ large, others small.

*Length* 1.5 to 1.9 mm.

*Alate viviparous female.* Head and thorax black; abdomen deep green with black lateral spots and broken black transverse

bars ; a large black patch base of cornicles ; legs green, fore pair with apices of tibiæ and the tarsi dark ; mid and hind with most of femora dark and apices of tibiæ and the tarsi. Antennæ not quite so long as body ; segments i. and ii. equal, i. wider than ii. ; iii. a little longer than iv., but shorter than flagellum of vi., with eleven to sixteen sensoria of unequal size ; iv. very little longer than v., no sensoria ; v. with the normal primary ; base of vi. about two thirds of v. ; flagellum as long as iv. + v. Cornicles short, rather thick, cylindrical, markedly imbricate, slightly swollen at base. Cauda as long or even longer than the cornicles, with a few pale hairs ; base surrounded by a large dark patch. Rostrum reaches to second coxæ.

*Length* 1.6 to 2.0 m.m.

FOOD PLANTS. *Chenopodium* spp. and Mangolds.

LOCALITIES. Herne Bay, 4 vii. 11 ; Wye, 7 viii. 13 (F.V.T.)

*Observations.* To some extent this resembles *rumicis*, but the nearly equal sized cauda and cornicles easily demark it and also from other species of similar general appearance.

#### APHIS INFUSCATA Koch.

*Aphis padi* Schrank (non. Linn.).

*Aphis padi* Walker\* (non Linn.).

Koch, Die Pflanz. 77, 20 pl. xiv., fig. 101 (1857) ; Schrank. Fn. Boica., II., 115, 1,216 (1801) ; Walker Ann. Mag. Nat Hist., Se. 2, V, 274, 78 (1850) ; Theobald, Entomologist XLVIII., 182 (1915).

*Alate viviparous female.* Uniformly brownish-black, shiny and smooth ; no powdery secretion as in apteræ ; antennæ brown ; cornicles and cauda black ; legs yellowish-brown, femora dark brown except at base ; base and apex of tibiæ dark and the tarsi. Antennæ shorter than body ; segment i. larger than ii. ; iii. longer than iv., a little shorter than flagellum of vi. ; with 26 to 32 *small* round sensoria, mainly along one side ; iv. longer than v., with 9 to 14 small round sensoria mainly on one side ; base of vi. rather more than half of iv. ; flagellum about as long as



iv. – v. Cornicles about as long as antennal segment v., irregularly cylindrical, some swollen slightly towards apex, markedly imbricate. Cauda more than half cornicles, four curved hairs each side and two dorso-apical. Cleared specimens show four large dark lateral spots; a dark area at sides of cornicles and a large dark area caudad of them; five small dark sub-median spots; an irregular dark area between cornicles and one on following segment and then a curved dark bar. A small lateral papilla arises from each of the dark lateral spots. Rostrum to or just past the second coxæ. First fork-cell small.

*Length* 1.9 to 2 mm.

*Apterous viviparous female.* Brown to dull slatey brown, with white or grey powdery secretion in places; thorax bare of it and the abdomen has a large central bare space, the sides with transverse bars of greyish-white to white secretion corresponding to the segments. Antennæ brown, base and segments iv. to vi. dark brown, in some the paler areas are dull yellowish; legs brown, but most of femora pale yellowish-brown. Cauda and cornicles black. Antennæ shorter than body; segment i. larger than ii.; iii. longer than iv.; iv. longer than v.; vi. about equal to iv. and v.; base about two-thirds of v. Rostrum thick, reaching to or just past second coxæ. Cornicles equal segment iv. of antennæ, irregular, some cylindrical, slightly enlarged basally, others with slight swelling towards apex. Cauda about three-quarter of cornicles; with a few curved hairs. Lateral papillæ marked.

*Length.* 1.9 to 2.2 mm.

FOOD PLANTS. *Prunus spinosus*; *P. insititia*; *P. padus*; *Salix* sp.

LOCALITIES. Romney Marsh 30 vi., 14; Wye, 7 vii., 16 (F.V.T.); Harpenden, Herts (J. Davidson); Maryculter, Craibstone, and general throughout N.E. Scotland wherever *Prunus padus* grows; 3 vii., 20 (F. Laing); and Huntly, Aberdeenshire, vii. 22 (E. Green), etc.

*Observations.* A marked dark species, with mealy secretion in the apteræ. It curls up the leaves and when on *Prunus spinosus* turns them yellow and pink and yellow and pale green on *P. insititia*. It has been taken by Schrank, Walker and Mordwilko

to be Linnæus *padi*. Linnæus's name *padi* (Syst. Na., X., 734, 8) refers to Reaumur's two Plum Aphides, *H. arundinis* and *A. helichrysi* (*vide* note in Appendix).

*APHIS CRATÆGELLA* Theobald nom. nov.

*Aphis cratægi* Buckton (non Kalt).

Theobald, List. Aphid., Hastings, 9 (1912); Buckton, Mono. Brit. Aphid, II., 35, pl. XLVII. (1877); Schouteden, Mém. Soc. Ent. Belg., XII., 220 (1906).

*Alate viviparous female.* Head and thorax deep olive-green to black; abdomen bright green; antennæ deep olive-green; fore legs same colour as body, mid and hind olive-green, except pale base of femora; cauda green; cornicles green to olive-green; eyes red; rostrum pale, apex dusky. Antennæ shorter than body; segment i. wider and longer than ii.; iii. very little longer than iv. with 32 to 38 sensoria all over it; iv. very little longer than v.,

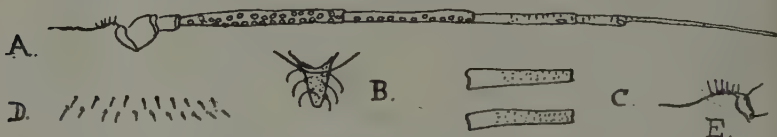


Fig. 93.—*Aphis cratægella* Theobald.

A. Antenna of alate ♀; B. Cauda; C. Cornicles; E. Cephalic hairs;  
D. Body hairs.

with 10 to 14 sensoria, more or less in a line; base of vi. not quite half of v.; flagellum longer than iii. Cornicles cylindrical, about as long as antennal segment v. Cauda more than half cornicles, 3 hairs each side. A few short hairs on head at base of antennæ on small raised lobes. Rostrum reaches second coxæ. Body with two irregular rows of short hairs on each segment. Fore legs much in advance of mid pair, hind close to mid.

*Length* 1.4 to 1.6 mm.

*Apterous viviparous female.* Various shades of green, very slightly mealy; body oval, with seven small dusky lateral spots. Antennæ shorter than body, green to dull ochre-yellow, apices

dusky. Cauda and anal plate green, former prominent and acuminate with a few hairs. Cornicles green, cylindrical, apices dusky. Legs green to ochreous, apices of tibiae and the tarsi dark.

*Length* 1.6 mm.

FOOD PLANT. *Cratægus oxyacantha*.

LOCALITIES. Haslemere, v.-vii. (Buckton); Wye and King's Woods, 8 vii. 26; Guildford, vi. 19; Crowhurst, Sussex (F.V.T.). Beauport, Hastings (Claude Morley); Hollington (Connold); Cadnam, Hants; Birmingham (F. Laing).

*Observations.* This species more or less blisters and rolls up the top leaves of the Hawthorn shoots and in this way as was described by Buckton it produces a tangled and curled up mass of foliage, often of a reddish-brown colour when the insects are becoming alate. Buckton found it not uncommon at Haslemere from May to July. I found it in great numbers on a hedge near the Wey at Guildford. At King's Wood and at Wye it was common in 1926 and caused a conspicuous appearance on some isolated Hawthorn trees. Buckton took this insect to be Kaltenbach's *Aphis cratægi*, a very distinct insect. In general appearance it resembles *Phorodon cratægarium* Walker, but the shorter antennæ at once demark it as well as the absence of the cephalic and antennal processes.

APHIS ERYSIMI Kaltenbach.

Kaltenbach, Mono. Pflanz, 99, 75 (1843); Schouteden, Mém. Soc. Ent. Belg., XII., 220, 18 (1906).

*Alate viviparous female.* Head and thorax black; abdomen greenish, with blackish lateral spots and broken dorsal bands. Antennæ deep brown, base of segment iii. pale; about as long as body. Cornicles yellowish, apices dark, slightly swollen. Cauda brownish, about half length of cornicles. Legs dusky yellow, apices of femora, tibiae and the tarsi dark; femora mostly dark. Antennal segment i. wider than ii.; iii. longer than iv. and about as long as vi., with 14 to 16 sensoria on one side; iv. slightly longer than v., with 5 to 6 sensoria; v. with 0—2 + 1; vi. with basal area slightly less than one-third length of flagellum. Eyes large,

dark brown. Cornicles about as long as antennal segment iv., somewhat swollen towards apices, where and at the base they may be dusky; rather thin and faintly imbricated. Cauda acuminate, with a few lateral hairs. Anal plate brownish. Stigma, costa and sub-costa yellow, veins blackish. Rostrum yellow, apex dusky, reaches to about second coxæ.

*Length* 1.5 mm.

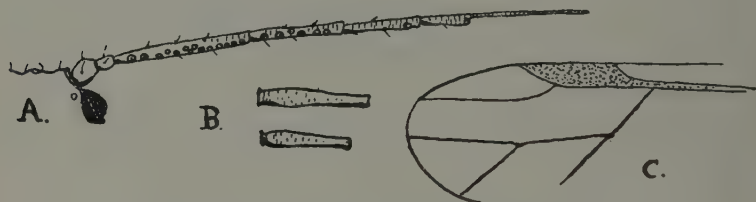


Fig. 94.—*Aphis erysimi* Kaltenbach.

A. B. and C. Antenna, cornicles, and apex of wing of alate ♀.

*Apterous viviparous female.* Green to greyish-green or greyish-yellow. Cornicles yellowish, more or less cylindrical, in some showing slight apical swelling, moderately long. Cauda deep yellow-green, about half length of cornicles. Legs pale to dusky yellow, apices of tibiae and the tarsi dark. Antennæ shorter than body, brownish, basal half of iii. pale; i. larger than ii.; iii. about as long as iv. + v. and as long as vi.; iv. a little longer than v.; basal area of vi. half length of flagellum and more than half length of v. Rostrum rather thick and short, only just reaching second coxæ. Cornicles about two-thirds length of antennal segment iii., imbricate. Cauda with the few lateral hairs closely appressed, often so as to be scarcely visible. Abdominal segmentation very marked and there are traces of dark spots.

*Length* 2 to 2.2 mm.

FOOD PLANTS. *Erysimum officinale*; *Capsella bursa-pastoris*; *Raphanus raphanistrum*.

LOCALITIES. Great Salkeld, 13 vi. 12 (Britten); Bearsted, Kent, vii. 16 (F.V.T.); Belgium (Schouteden); Germany (Kaltenbach).

*Observations.* I found this rather peculiar Aphis on Garlic Mustard in Kent and also on *Sisymbrium alliaria*. The same insect was sent me by Mr. Britten from the North from *Capsella bursa-pastoris*, a food plant also given by Kaltenbach. I am rather doubtful in placing it in the genus *Aphis*, owing to the somewhat clavate cornicles. One apterous female I have shows sensoria on segments iii. to v. and basal area of vi. of the antennæ. The colour of the legs in *Capsella* form varies, some being much darker than others and also the body markings. Davis' *Aphis pseudobrassicæ* bears some resemblance, but is quite distinct; in Davis' species the cornicles are much shorter and the cauda in both alatae and apterae are about the same length; in *erysimi* the cornicles are longer than the cauda and the body markings are quite distinct.

#### APHIS TINCTA Walker.

Zoologist, VII., 51, App. (1849).

*Apterous viviparous female.* Green to pale yellow-green, often with three darker green median longitudinal lines on the abdomen. Antennæ green, except at apices. Eyes red. Cornicles pale yellow-green, apices dusky. Cauda and anal plate yellowish-green. Legs same colour as body, apices of tibiæ dark and the tarsi. Rostrum yellow, apex dark. Antennæ not quite so long as body; segment i. much larger than ii.; iii. longer than iv., not so long as vi.; iv. a little longer than v.; vi. with basal area about one-third of v.; flagellum as long as iii. Rostrum rather broad, short, only just passing first coxæ. Cornicles pale, cylindrical, about one-fifth to rather more the length of body, longer and thicker than antennal segment iv. Cauda prominent, bluntly pointed, about two-thirds length of cornicles; four rather long hairs each side. Anal plate rounded, with several long hairs. A prominent blunt papilla between the cornicles and cauda and one each side of abdomen behind the third legs and traces of others. Legs rather long.

*Length* 1.7 mm.

**FOOD PLANT.** Willow Herb (*Epilobium montanum*).

**LOCALITY.** Wye, 2 viii. 13 (F.V.T.); Skirwith, Cumberland (F. Laing).

*Observations.* With some large colonies of Walker's *Aphis præterita* and *A. diphaga* I have found a third species with pale cornicles and long antennæ which is quite distinct. This seems to be Walker's *Aphis tincta*. It is quite distinct from the other *Epilobium* species. I was unable to find Walker's type of this species in the British Museum and so have assumed this is the insect he so shortly described. Walker describes seven species from *Epilobium*. Four I have redescribed here in part. I give his short descriptions of the other three.

#### APHIS EPILOBIINA Walker.

Zoologist, p. 53, 1849.

*Apterous viviparous female.* Green, elliptical. Legs pale yellow; apices of antennæ, rostrum, tibiæ and the tarsi dark. Eyes black; cauda and anal plate and cornicles darker than body. Antennæ long, but not quite so long as body; segment i. wider but no longer than ii.; iii. about  $1\frac{1}{2}$  times iv., not so long as vi.; iv. and v. about equal; vi. with flagellum nearly as long as iv. + v.

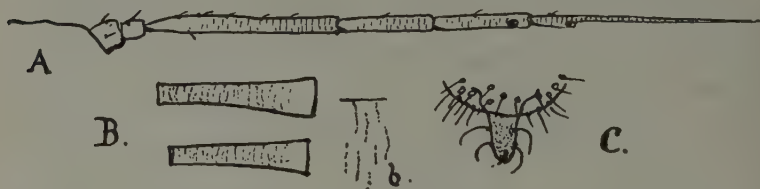


Fig. 95.—*Aphis epilobiina* Walker.

A. Head and antenna; B. Cornicles; b. sculpturing on B.; C. Cauda and anal plate of apterous ♀.

iii. to vi. imbricate; hairs short. Rostrum reaches to nearly third coxæ. Cornicles cylindrical, thick, swollen basally, not quite so long as segment iii., imbricate. Cauda about one-half cornicles, rather broad; 2 curved hairs each side and 1 dorso-apical. Anal plate rounded, with several long hairs. Legs rather long; femora and tibiæ hairy.

Length 1 to 1.3 mm.

*Alate viviparous female.* Thorax black; abdomen deep green, a row of black spots each side; border and venter of prothorax



green. Antennæ black, much shorter than body. Cornicles black, one-eighth of body. Legs yellow, femora black, except base; tips of tibiæ and the tarsi black.

FOOD PLANT. *Epilobium angustifolium*.

LOCALITY. Southgate, 24 viii. 47 (Walker).

*Observations.* The apterous female, re-described from a slide (47, 61) in the British Museum; there is also one of Walker's slides in the Hope Museum, Oxford, but I could not find one in the Dublin Museum amongst Walker's specimens. The imbrications on the apterous female cornicles are as rows of fine dots.

APHIS RUFULA Walker.

Zoologist, 47, App., 1849.

*Apterous viviparous female* (immature). The following description is drawn up from a slide sent me by Mr. F. Laing, prepared from a carded specimen in the Walkerian collection, not named, but with the food plant *Salsola kali* given in Walker's handwriting.

"Antennæ very short, scarcely reaching second legs, of six segments; i. much wider than ii.; iii. a little more than twice ii. more than one-half of the flagellum; iv. a little shorter than v.,



Fig. 96.—*Aphis rufula* Walker.

A. Head and antenna of immature apterous ♀; B. Cornicles.

which has a prominent primary sensorium; vi. with base two-thirds of v., flagellum about 3 times the base; a few short hairs. Rostrum rather thick, last two segments dark, reaching just past second coxæ. Cornicles short, cylindrical, about equal to segment iii. Anal plate and cauda spinose, with a few hairs. Legs rather

short and thick, especially the hind tibiæ, which are hairy. Abdomen with transverse bands of short hairs."

The antennæ, legs and cornicles in the cleared specimen are brown.

#### APHIS PENICILLATA Buckton.

Mono. Brit. Aphid, II., 51, pl. LI., figs. 5 and 6 (1877). Schouteden, Mém. Soc. Ent. Belg., XII., 225 (1906).

"*Apterous viviparous female*. Bright green, rather glaucous, deeply carinated and domed. Antennæ, legs and nectaries pale drab. Genua, tips of antennæ, tarsi and tibial tips, ochreous-brown. Tail green. Size of body  $1.64 \times 1.01$  mm. Length of antennæ 1.01 mm., of cornicles 0.50 mm.

*Alate viviparous female*. Head, antennæ and thorax black. Eyes dark brown. Abdomen dark green. Prothorax and edge of abdomen furnished with black spines or papillæ. Cornicles dark green, with paler tips. Legs black, with upper parts of tibiæ ochreous. Tail dark green. Rostrum reaches to the second coxæ. Sternum black. Under side of body green. Wings greyish, with black veins, which are sharply defined. Stigma dusky.

Taken at Pembroke in July on the Willow Herb (*Epilobium montana*) and subsequently at Haslemere, feeding on the flower stalks of the same plant. The very old specimens, apterous and otherwise are often nearly black." (Buckton.)

There is an unnamed slide in the British Museum of Buckton's labelled  $\frac{B}{U} \cdot \frac{L}{I}$  that may be this species. All the specimens are badly mounted, but one shows the cornicles dark at the base as figured by Buckton in the alate female. This seems to give a clue to its being Buckton's species—*penicillata*. Appended are a few details that it is possible to make out. "Antennæ shorter than body; segments i. and ii. dark, iii. dusky; i. and ii. about equal; iii. and iv. equal; iii. with 6-10 unequal sized sensoria; iv. a little shorter than v., with 3-6 small sensoria; v. with primary sensorium, some little way from apex; flagellum of vi. from  $2-2\frac{1}{2}$  times length of base. Cornicles shorter than iv., a little longer than v., cylindrical, imbricate, darker at base than apex. Cauda,

about three-quarters of cornicles, broad, 4 curved hairs, each side and 2 dorso-apical. Lateral abdominal papillæ present. No labelled *type* slide exists.

APHIS EDENTULA Buckton.

Mono. Brit. Aphid., II., 39, pl. XLVIII., figs. 1-3 (1877).

*Apterous viviparous female.* "Body oval, pale green, slightly punctured. Not mealy. Antennæ nearly the length of the body. Faintly-marked pores are usually seen down the thorax and abdomen. Legs and nectaries slightly olive. Eyes warm brown.

*Pupa.* Much like the larva in form and colour, but paler green. Four darker green marks or folds occur on each side of the back. Wing-cases green, as also are the antennæ and legs.

*Winged viviparous female.* Head broad. Neck ring, thorax, abdomen, antennæ and legs, pale yellowish-green. The rest of the neck, thoracic lobes, scutellum and nectaries pale brown. Femoral tips brown. Wings greenish, with pale stigmata and light brown veins. Prothorax is devoid of the two spines which occur in the last species described (*subterranea* Wlk.)."

*Length*  $1.77 \times 0.62$ .

*Apterous oviparous female.* "Oval, smooth, shining, sienna-brown, often mottled with yellow, from the five or more eggs which appear through the skin. Head slightly olive. Eyes brown. Antennæ very short, brown or black, and darkest at the tips. Cornicles small and dark olive. Legs much shorter than in the other forms. The hind tibiæ flattened, and tapered towards the tarsi. Tail pale yellow and small. Some specimens are much darker than others, and approach to a reddish-brown.

*Size of body*  $1.54 \times 0.76$  mm.

Plentiful on the Whitethorn at Wanstead in November, where it was mixed up with the pupæ and the winged females. These insects were sent to me by Mr. Walker, who, nevertheless, could not satisfy himself of their species. It does not appear to be *A. crataegaria* Walker; and as it wants the thoracic spines, and also does not, so far as I can discover, possess the two small

tubercles on the abdomen characterised by Kaltenbach, it cannot be his *Aphis crataegi*. I think it is therefore well to give it the provisional name of *A. edentula* from its abdominal toothless character."

This is not represented in Buckton's collection.

#### APHIS PEDICULARIS Buckton.

Mono. Brit. Aphid., II., 41, pl. XLVIII., fig. 4, 5 (1877).

*Apterous viviparous female*. "The general colour of this insect is dull yellowish-green; form broadest across the nectaries. Head convex. Eyes brown. Abdomen very transparent, showing the underlying tracheal-like plaiting of silver threads. Nectaries and the legs stout, the last a little clouded at the tips of the femora and tarsi. Tail large, green and hairy. Rostrum reaches to nearly the second coxæ. Body slightly mealy.

The young just born measure  $0.025 \times 0.012$  inch. The nectaries are at this time very short, whilst the rostrum reaches considerably beyond the third coxæ. Found numerously between the seed pods of the Louse Wart, *Pedicularis palustris*, in the Norfolk fens, about the middle of July."

The proportions of the antennal segments are as follows:  $\frac{1}{22}$ ,  $\frac{2}{15}$ ,  $\frac{3}{35}$ ,  $\frac{4}{35}$ ,  $\frac{5}{50}$ ,  $\frac{6}{30 \frac{1}{2} 35}$ . Cornicle=100. Cauda=70, with 4 setæ each side. From Buckton's type in the British Museum (F. Laing).

#### APHIS INSTABILIS Buckton.

Mono. Brit. Aphid., II., 94, pl. LXVIII., figs. 1-5 (1877).

*Apterous viviparous female*. "Exceedingly variable as to colour, often pale ochreous, yellow, green, or ferruginous red. Oblong. Head very broad. Eyes brown. Dorsum much furrowed. Cornicles very pale. Cauda small, pilose. Legs stout, ashy grey. Two small tubercles occur on the antipenultimate ring. Size 1.27 mm.

*Pupa*. Var. 1.—Wholly pale yellow. Thorax deep furrowed. Nectaries pale, with black tips. Cauda black, obtuse. Wing-cases black. Legs sooty-grey. Abdomen slightly hoary, from a grey covering of white powder.

Var. 2.—Head and thorax ferruginous. Abdomen bright green. Legs very pale yellow. Wing-cases luteous.

*Winged viviparous female.* On first emerging from the pupa pale green. Head, thorax and band on the prothorax black. Eyes red. Abdomen domed, with four black spots on each carina. Cornicles and tail pale yellow or green. More mature specimens are ferruginous red. Head, thorax and greater part of the abdomen black. Cornicles and tail black. Legs reddish, with black femoral and tibial points. Wings large; cubitus, stigma and veins yellowish-green. This *Aphis*, when young, changes its colour, chameleon-like, almost every five minutes, so much so as to render it difficult to copy it with the brush. Great numbers were taken on the fever-few, *Pyrethrum inodorum*, towards the end of July during thundery weather. At that time the pupæ were fast splitting their skins and giving birth to the bright green imagos. This insect also infests *Epilobium montanum* and *E. parvifolium*.

Specimens were obligingly sent me from Pembroke by Mr. Charles Barrett."

The type of this species is not in the British Museum.

#### WALKER'S SPECIES NOT FOUND.

##### *Alate viviparous females.*

Abdomen dark green and border of prothorax, head and thorax black. Cornicles black, one-eighth of body. Legs dull yellow and black. *despecta.*

Abdomen greenish-black; head and thorax black; cornicles black, one-sixth of body; legs black and yellow. *pollinosa.*

Yellow, narrow, linear; head and thoracic lobes brown; prothorax pale red with brown band. Cornicles yellow, one-eighth of body. Legs yellow and black. *tenuior.*

##### *Apterous viviparous females.*

Grass green, paler towards head, dull; cornicles yellowish-white, apices dark brown, one-sixth of body; legs pale yellow and black. *despecta.*

Saffron colour, borders of sutures of segments pale yellow; cornicles pale yellow, apices black, one-sixth of body; legs pale yellow and black. *euphorbiæ.*

Species described by Walker, probably coming in this genus.

## APHIS DESPECTA Walker.

Zoologist, VII., liii. (1849).

" *The wingless viviparous female.* The body is small, nearly elliptical, rather flat, grass-green, not shining, paler towards the head ; the antennæ are pale yellow, with brown tips and are much shorter than the body ; the eyes are black ; the rostrum is pale green, with a black tip and reaches to the middle coxæ ; the tubes are yellowish-white, with brown tips and are as long as one-sixth of the body ; the legs are pale yellow and moderately long ; the knees, the tarsi and the tips of the tibiæ are black.

*The winged viviparous female.* Whilst a pupa it much resembles the wingless Aphis in colour. The winged insect is deep velvet-like black ; the borders of the prothorax and the abdomen are dark green ; the antennæ are black, shorter than the body ; rather stout, till near their tips ; the eyes are black ; the rostrum is dull green, with a black tip ; the tubes are black and as long as one-sixth of the body ; the legs are dull yellow ; the four hinder thighs excepting the base, the knees, the tarsi and the tips of the tibiæ are black ; the wings are colourless and longer than the body ; the squamulæ are pale green ; the stigmata and the veins are brown. End of June." On *Epilobium*.

There appears to be no slide or material of this in Walker's collection in the British Museum.

## APHIS POLLINOSA Walker.

Zoologist, VIII., lii. (1849).

" *Wingless viviparous female.* The body is rather small, oval, plump, deep velvet-like green, powdered with white ; the limbs are white ; the antennæ have black tips and are shorter than the body ; the tip of the rostrum and the eyes are black ; the tubes are nearly one-sixth of the length of the body ; the legs are dull white and moderately long ; the tarsi are black.

Var. 1. The knees and tips of the shanks are black.

Var. 2. The body is mottled pale green.

Var. 3. The body is pale green.

Var. 4. The legs are pale yellow ; the tarsi and the tips of the tibiæ are brown.



*The winged viviparous female.* While a pupa it resembles the wingless Aphis in colour, but is narrower and more flat and less velvet like ; the rudimentary wings are white or black. The winged insect is deep black ; the abdomen greenish-black ; the eyes and the antennæ are black, and the latter are much shorter than the body ; the rostrum is yellow, with a black tip ; the tubes are black and as long as one-sixth of the body ; the legs are black ; the tibiæ and the fore thighs are yellow ; their tips are black ; the wings are slightly tinged with grey and are much longer than the body ; the squamulæ are dull white ; the stigmata and the veins are brown." (Walker.) On *Epilobium*.

APHIS TENUIOR Walker.

Zoologist, VII., App. xlix. (1849).

*"The winged viviparous female.* The body is yellow, narrow and linear ; the head and the lobes of the thorax are brown ; the prothorax is pale red, and has a short pale brown band ; the breast is black ; the antennæ are black, rather thick towards the base and much shorter than the body ; the rostrum is pale yellow ; its tip and the eyes are black ; the tubes are yellow and as long as one-eighth of the body ; the legs are yellow ; the tarsi and the tips of the tibiæ are black ; the wings are colourless ; the squamulæ are pale yellow ; the brands and the veins are brown." Walker described this species from the Larch (*Larix communis*). It has not since been noticed.

Mr. Laing cannot trace any slide or material of this in the British Museum.

APHIS EUPHORBILÆ Walker.

Zoologist, VII., App. xliii. (1849).

*"The wingless viviparous female.* The body is saffron colour, somewhat small, rather flat, nearly linear, or slightly broader towards the abdomen ; the borders and the sutures of the segments are pale yellow ; the antennæ are pale yellow and very nearly as long as the body ; the tips of the joints are black ; the eyes are bright red ; the rostrum is pale yellow, with a black tip ; the tubes are pale yellow, with black tips and as long as one-sixth

of the body ; the legs are long and pale yellow ; the thighs are pale green ; the knees and the tips of the tibiæ are dark yellow ; the tarsi are black. In the beginning of October.

FOOD PLANT. The Petty Spurge (*Euphorbia peplus*)."

I have been unable to find this species and there is no record of it since Walker's time, and no type exists in the British Museum, nor amongst Walker's specimens in the National Museum of Ireland, or in the Hope Museum at Oxford.

#### APHIS INTRODUCTA Walker.

Zoologist, VII., App. lvii. (1849).

"*Wingless oviparous female*. The body is very small, oval, slightly convex, shining, dark green, with a rim on each side of the body ; the head is yellow ; the antennæ are pale yellow and about half the length of the body ; the tips of the joints are black ; the rostrum is pale yellow ; its tip and the eyes are black ; the legs are pale yellow ; the knees, the tarsi, the tips of the tibiæ and the whole of the hind tibiæ are black ; the latter are rather wide."

FOOD PLANT. *Reseda odorata*.

*Observations*. Walker gives no locality or date. In 1882 I found the Wild Mignonette at Bodiam in June covered with a dull green Aphis. It may have been this species.

There is no trace of any of Walker's material of this species.

#### APHIS CONFUSA Walker.

Zoologist, VII., App. xlvi. (1849).

"*The wingless viviparous female*. The body is small, oval, rather flat, smooth, green, not shining ; the sides of the abdomen are paler ; the antennæ are white, black towards their tips and much more than half the length of the body ; the rostrum is very pale yellow ; its tip and the eyes are black ; the tubes are pale yellow, with black tips and about one-eighth of the length of the body ; the legs are pale yellow and moderately long ; the tarsi are black. Found with the preceding (*A. conspersa*) in the

autumn, near Newcastle by Mr. Hardy." On Field Scabious (*Scabiosa arvensis*).

No specimens of this occur in Walker's collections in the British Museum, Irish Museum, or Hope Museum at Oxford. It is probably only *Aphis scabiosæ* Schrank.

Genus *APHIDIELLA* Theobald.

Ent. Mo. Mag., IX., 105 (1923).

Head almost flat, but slightly elevated at base of each antenna; median ocellus irregularly oval or pyriform. Antennæ longer than body; of 6 segments. Sensoria of alate ♀ few and rounded. Cornicles rather long and cylindrical, about as long as antennal segment v.; apices markedly reticulate as in *Macrosiphoniella*. Cauda small, triangulate, not half so long as the cornicles and not overlapping the anal plate. Wings very large, with normal venation.

*APHIDIELLA SECRETOCAUDA* Theobald.

Ent. Mo. Mag., IX., 105 (1923).

*Alate viviparous female*. Apparently green, with darkened head; thoracic lobes, cornicles and cauda dark. Legs same colour as body with darkened apices to femora and tibiæ; tarsi dark. Segment i. of antennæ much larger than ii.; iii. longer than iv.; not so long as vi., with 6 to 9 round sensoria in a line

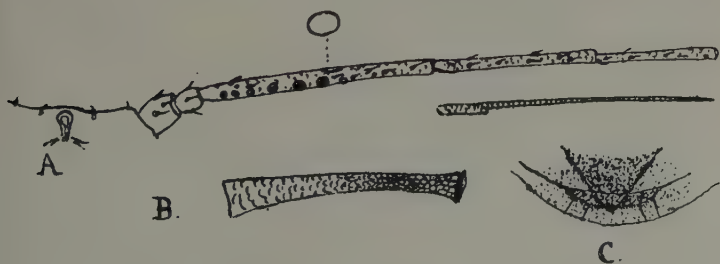


Fig. 97.—*Aphidiella secretocauda* Theobald.

Alate viviparous ♀. A. Head and antenna;  $\times 40$ ; B. Cornicle; C. Cauda and anal plate,  $\times 80$ .

on basal half ; iv. slightly longer than v., the latter with well defined sensorium ; vi. with long flagellum, a large round primary and 6 small secondary sensoria at its base ; median ocellus elongate oval almost pear shaped. Rostrum rather broad, nearly reaching to second coxæ. Fore and mid legs widely separate, the latter very close to the hind pair. Cornicles cylindrical, narrow, about as thick as antennal segment iii., somewhat curved inwards ; apices with very marked large reticulations. Cauda triangulate, not half length of cornicles and not overlapping the flattened anal plate. Legs rather long ; tibiæ spinose, especially towards the apices. Wings large, passing well beyond the extended hind legs.

*Length* 2 mm.

FOOD PLANT. Yellow Horned Poppy (*Glaucium luteum*).

LOCALITY. Dymchurch, Kent, 20 vi. 20.

*Observations.* Described from specimens taken by Mr. A. Duffield, M.C., with an Anuraphid I described as *glaucifolia*, but which is only *helichrysi*. It is a very marked Aphid which on account of the short triangulate cauda, the long cornicles with marked reticulate apices, the long antennæ cannot well be placed in any previously described genus. *Type* in the writer's collection.

Genus ANURAPHIS Del Guercio.

*Brachycaudus* Van der Goot.

*Dentatus* Van der Goot.

*Semiaphis* Van der Goot.

*Acaudus* Van der Goot.

*Yezabura* Matsumura.

*Sappaphis* Matsumura.

Del Guercio, Redia IV., 190 (1907) ; Van der Goot, Tijds. v. Ent., 56, 97 (1913) and 56, 105 (1913) ; Matsumura, Journ. Coll. Agri., Tohoku Univ., 7, pl. 6, 392 (1917) ; Trans. Sapporo Nat. Hist. Soc., 7, pt. I., 18 (1918) ; Baker, Bull. 826, U.S. Dep. Agri., 42, pl. vi., C. to F. (1920).

The many species coming in this genus have usually been placed in the genus *Aphis*. The genus *Anuraphis* was erected by

el. Guercio in 1907, the type being Koch's *Aphis pyri* and he placed in this genus also Koch's *Aphis lappæ*, *Aphis myosotidis*, *centaureæ*, *A. farfaræ*, Kaltenbach's *A. ranunculi*, *A. tragopogonis* and *A. prunicola*, Boyers' *persicæ*, Ferrari's *iane*, and his own species *iridis*. Baker says, "These species with the exception of *lappæ* and *tragopogonis* which belong to *Aphis*, have broadly and somewhat abruptly conical cauda, quite unlike that of the genus *Aphis*." The insects I have identified as the European *lappæ* and the common *tragopogonis*, two very marked species, certainly come in this genus and not in *Aphis*. The type of Van der Goot's *Brachycaudus*, the *Aphis myosotidis* of Koch, the *Aphis helichrysi* of Kaltenbach, is a typical *Anuraphis*, this genus thus sinks as a synonym. The genus *Semiaphis* has Koch's *carotæ* as type, this also is a typical *Anuraphis*. The genus *caudus* was founded on *Aphis lychnidis* Kalt., also a typical *Anuraphis*. Van der Goot's genus *Dentatus* must also sink as a synonym for the type of it, Boyer's *tulipæ* is certainly an *Anuraphis*, in spite of the fact that it has minute dorsal papillæ on the abdomen.

The characters of the genus are as follows: Head with no marked frontal processes.\* Antennæ normal, of 6 segments, tibiae round. Cornicles usually very short in apteræ, some moderately long, cylindrical, more or less expanded basally. Cauda short and broad, more or less abruptly conical or rounded, in many cases nearly hidden under the abdomen, never protruding far and not so constricted at the base as in *Aphis*. Males minute. Oviparous females apterous. Venation normal.

Some species usually placed in this genus seem to form a marked natural group, whose characters do not seem to me to be sufficiently defined to form a separate genus. This may be called group 2, and it contains species which are rather heavily built and thick skinned, many mealy in nature which when living on the foliage of trees cause much and marked leaf curling. Both apteræ and alatæ have paired sub-median apical dorsal papillæ, one to three pairs, most marked in the apteræ, and the summer forms have rather long cornicles, like *cardui*, and in some stages of certain species the cauda is more *Aphis* like than in *Anuraphis*. Some are subterranean.

\* In some stages of *A. roseus* Baker, the lateral frontal processes are enlarged.

BRITISH SPECIES OF *Anuraphis*.

## GROUP I.

<i>Anuraphis</i>	<i>kochi</i>	Schouteden.
„	<i>subterranea</i>	Walker.
„	<i>amygdali</i>	Buckton.
„	<i>angelicæ</i>	Koch.
„	<i>cardui</i>	Linnæus.
„	<i>cynariella</i>	Theobald.
„	<i>insititiæ</i>	Koch.
„	<i>tulipæ</i>	Boyer.
„	<i>dauci</i>	Fabricius.
„	<i>helichrysi</i>	Kaltenbach.
„	<i>helichrysi</i> var. <i>centauriella</i>	Theobald.
„	<i>ulmarjæ</i>	Schrank.
„	<i>lappæ</i>	Koch.
„	<i>farfaræ</i>	Koch.
„	<i>neoprunifex</i>	Theobald.
„	<i>exul</i>	Walker.
„	<i>tragopogonis</i>	Kaltenbach.
„	<i>lychnidis</i>	Linnæus.
„	<i>rumicella</i>	Theobald.
„	<i>tanacetina</i>	Walker.
„	<i>verbenæ</i>	Macchiati.
„	<i>achilleæ</i>	Fabricius.
„	<i>sherardiæ</i>	Theobald.
„	<i>leontodoniella</i>	Theobald.
„	<i>bellis</i>	Buckton.
„	<i>opima</i>	Buckton.
„	<i>lentiginis</i>	Buckton.
„	<i>crithmi</i>	Buckton.*
„	<i>inculta</i>	Walker.
„	<i>vacillans</i>	Walker.
„	? <i>triphaga</i>	Walker.
„	? <i>robusta</i>	Walker.
„	? <i>conspersa</i>	Walker.

\* I have not seen this insect, it is very close to, if not identical with *A. angelicæ* Koch. A further note concerning it will be added in the Appendix.



## GROUP 2.

- Anuraphis sorbi* Kaltenbach.  
 „ *roseus* Baker.  
 „ *heraclei* Koch.  
 „ *cratægi* Kaltenbach.  
 „ *ranunculi* Kaltenbach.  
 „ *aucupariæ* Buckton.

This group might well form a separate genus.

FOOD PLANTS OF *Anuraphis*.

## GROUP I.

- |                                |   |
|--------------------------------|---|
| <i>Achillea millefolium</i>    | <i>A. achilleæ</i> Fabr.                          |
| „ „                            | <i>A. helichrysi</i> Kalt.                        |
| „ <i>ptarmica</i>              | <i>A. helichrysi</i> Kalt.                        |
| <i>Angelica sylvestris</i>     | <i>A. angelicæ</i> Koch.                          |
| <i>Anthemis tinctoria</i>      | <i>A. helichrysi</i> Kalt.                        |
| <i>Acroclinium roseum</i>      | <i>A. helichrysi</i> Kalt.                        |
| <i>Artemisia abrotani</i>      | <i>A. helichrysi</i> Kalt.                        |
| <i>Arctium lappa</i>           | <i>A. lappæ</i> Koch.                             |
| „ „                            | <i>A. angelicæ</i> Koch.                          |
| <i>Apium graveolens</i>        | <i>A. inculta</i> Wlk.                            |
| <i>Balsamita suaveolens</i>    | <i>A. helichrysi</i> Kalt.                        |
| <i>Bellis perennis</i>         | <i>A. bellis</i> Buck.                            |
| <i>Capsella bursa-pastoris</i> | <i>A. helichrysi</i> Kalt.                        |
| <i>Carduus spp.</i>            | <i>A. cardui</i> Linn.                            |
| <i>Cineraria sp.</i>           | <i>A. helichrysi</i> Kalt.                        |
| „ „                            | <i>A. opima</i> Buck.                             |
| <i>Cydonia vulgaris</i>        | <i>A. kochi</i> Schout.                           |
| <i>Chrysanthemum sp.</i>       | <i>A. cardui</i> Linn.                            |
| <i>Crithmum maritimum</i>      | <i>A. crithmi</i> Buck.                           |
| <i>Crocus sp.</i>              | <i>A. tulipæ</i> Boyer.                           |
| <i>Centaurea nigra</i>         | <i>A. helichrysi</i> v. <i>centauriella</i> Theo. |
| <i>Chionodoxa</i>              | <i>A. tulipæ</i> Boyer.                           |
| <i>Cicuta virosa</i>           | <i>A. angelicæ</i> Koch.                          |
| <i>Cynoglossum officinale</i>  | <i>A. helichrysi</i> Kalt.                        |
| <i>Cynara sp.</i>              | <i>A. cynariella</i> Theo.                        |
| <i>Daucus carota</i>           | <i>A. lappæ</i> Koch.                             |
| „ „                            | <i>A. dauci</i> Fabr.                             |

<i>Epilobium parviflorum</i>	A. instabilis Buck.
<i>Filago germanica</i>	A. helichrysi Kalt.
<i>Gladiolus</i>	A. tulipæ Boyer.
<i>Glaucium luteum</i>	A. helichrysi Kalt.
<i>Hedera helix</i>	A. angelicæ Koch.
<i>Helianthemum tuberosum</i>	A. rumicella Theob.
<i>Helichrysum chrysanthemi</i>	A. helichrysi Kalt.
„ <i>arenarium</i>	A. helichrysi Kalt.
<i>Lilium spp.</i>	A. tulipæ Boyer.
<i>Lychnis diurna</i>	A. lychnidis Linn.
„ <i>viscaria</i>	A. lychnidis Linn.
„ <i>sp.</i>	A. lychnidis Linn.
<i>Myosotis sp.</i>	A. helichrysi Kalt.
„ „	A. cardui Linn.
<i>Matricaria sp.</i>	A. helichrysi Kalt.
„ „	A. cardui Linn.
<i>Pastinaca sativa</i>	A. subterranea Wlk.
<i>Prunus domestica</i>	A. helichrysi Kalt.
„ <i>insititia</i>	A. insititiæ Koch.
„ <i>spinosa</i>	A. neoprunifex Theo.
„ <i>spinosa</i>	A. helichrysi Kalt.
„ <i>amygdalina</i>	A. amygdali Buck.
<i>Pimpinella nigra</i>	A. subterranea Wlk.
„ <i>saxifraga</i>	A. subterranea Wlk.
<i>Pyrus pyrauster</i>	A. kochi Schout.
„ <i>pyri</i>	A. lentiginis Buck.
<i>Pedicularis palustris</i>	A. pedicularis Buck.
<i>Pyrethrum inodorum</i>	A. instabilis Buck.
<i>Rumex sp.</i>	A. subterranea Wlk.
<i>Sambucus nigra</i>	A. exul Wlk.
<i>Senecio jacobæa</i>	A. cardui Linn.
„ <i>vulgaris</i>	A. helichrysi Kalt.
<i>Sherardia</i>	A. sherardiæ Theob.
<i>Spiræa ulmaria</i>	A. ulmariæ Sch.
„ <i>salicifolia</i>	A. ulmariæ Sch.
<i>Scilla sp.</i>	A. tulipæ Boyer.
<i>Tulipa</i>	A. tulipæ Boyer.
<i>Tragopogon pratensis</i>	A. tragopogonis Kalt.
<i>Tussilago farfara</i>	A. farfaræ Koch.
„ „	A. vacillans Wlk.

<i>Trifolium spp.</i>	<i>A. helichrysi</i> Kalt.
<i>Taraxacum</i>	<i>A. leontodoniella</i> Theob.
<i>Umbelliferae</i>	<i>A. helichrysi</i> Kalt.
<i>Verbenæ chamædryfolia</i>	<i>A. verbenæ</i> Macc.
„ <i>officinalis</i>	<i>A. verbenæ</i> Macc.
„ <i>sp. ?</i>	<i>A. verbenæ</i> Macc.
<i>Veronica spp.</i>	<i>A. helichrysi</i> Kalt.

# KEY TO ALATE FEMALES.

A. Sensoria of antennæ very numerous on iii. and iv.

- a. Dark dorsal abdominal patch and lateral spots. Bright green to yellow-green ; segment iii. with 110 to 130 ; iv. 48 to 59. Cauda with 15 to 17 hairs. *kochi*.  
Dull green to pale red ; iii. 54 to 80 ; iv. 20 to 22 ; cauda 2 hairs each side ; cornicles with lines of fine dots. *subterranea*.

AA. Sensoria fewer or normal.

B. Abdomen adorned.

- b. With median dark dorsal spot.

Abdomen dull rusty yellow or greyish-green, a large dark dorsal patch and spots or irregular bars in front ; 4 black lateral spots ; iii. with 32 to 38 ; iv. with 8 to 12. *amygdali*.

Abdomen reddish-yellow, a marked dorsal patch ; 3 black bars behind ; 4 pairs of black lateral spots ; no markings cephalad of dorsal patch. Cauda and cornicles black. *angelicæ*.

Abdomen green, yellow-green or ochreous or tawny to almost black, shiny ; a dark dorsal patch, 2 black bars behind, 3 large black lateral spots, 5 smaller ones below ; cornicles longer than *amygdali* and *angelicæ* ; iii. 27 to 32 ; iv. 0 to 2. *cardui*.

Abdomen green, a large black area from segment iv. to apex, spreading right across posteriorly ; 5 pairs of black lateral spots. *insititiæ*.

Abdomen pale fawn, white, pale yellow, pale pink, rarely pale green ; iii. 48 to 60 ; iv. 3 to 30 ; cauda 2 pairs hairs. *tulipæ*.

Abdomen green, a large dark dorsal patch, other black markings and lateral spots; iii. 16 to 60; iv. 0 to 12; cauda 3 to 2 hairs each side. *helichrysi*.

Abdomen pinkish-brown, pinkish-yellow to greenish; black bars merging to form a dorsal patch; iii. 55 to 60; iv. 10 to 12; caudal hairs 2 and 2 or 3 and 3. var. *centauriella*.

Green; a very large dark central area and very large dark lateral spots and dark around base of cornicles; iii. 30 to 35; iv. 0 to 2. *lappæ*.

Abdomen brown above, yellowish or greyish-brown below; dorsally a dark median patch, lateral spots and bars behind; iii. 32 to 38; iv. 18 to 20; v. 0 to 2 + 1.

*tragopogonis*.

*bb*. Abdomen ornamented but no marked dorsal dark patch.

Head and thorax rusty red, abdomen yellowish-green; 3 pairs of black lateral spots; black bands behind and traces of dark median paired areas on segments i. to iii.

*farfaræ*.

Abdomen ferruginous red, 7 or more black dorsal bands; 3 spots each side.

*bellis*.

Bright yellow, a double row of black spots and 2 or more large dorsal bands.

*opima*.

*bbb*. Abdomen with dark lateral spots only.

*c*. Abdomen, etc., dark.

Abdomen deep brownish-green to almost black, shiny, with darker lateral marks; venter pale, apex dark; iii. 28 to 32; iv. 9 to 12.

*neoprunifex*.

Abdomen dark green to almost black, edges paler green; iii. 27 to 30; iv. 10 to 14.

*exul*.

Abdomen deep green to almost black. Cornicles short and thick; iii. 26 to 30; iv. 0.

*rumicella*.

*cc*. Abdomen not all dark.

Green with rusty blotches; 3 dark spots each side.

*lentiginis*.

*BB*. Abdomen unadorned.

Head and thorax dark; body dull yellowish-green to brownish-ochreous. iii. 15 to 22; iv. 4 to 5.

*achilleæ*.

Body all green to yellow; iii. 28 to 32; iv. 7 to 9.

*verbenæ*.

Body all green; very small; iii. 13; iv. 5 to 7.

*sherardiæ*.

Body deep rich brown to almost black ; iii. 20 to 30 ; iv. 0 to 4. *lychnidis*.

*ANURAPHIS KOCHI* Schouteden.

*Aphis pyri* Koch (non Boyer).

Koch, Die Pflanzenläuse, 60, 8, figs. 76, 77, pl. x (1857) ; Schouteden, Ann. Soc. Ent. Belg., XLVII., 185 (1906) ; Baker and Turner, Journ. Agri. Res. VII., 324 (1916).

*Alate viviparous female*. Bright green to yellowish-green ; head, thorax, cornicles and antennæ black. A black patch in front of and between the cornicles on the abdomen and 2 black lines behind. Thorax with green areas on and around the black. Three marked black spots each side of abdomen. Legs green ; most of femora, apices of tibiæ and the tarsi black. Cornicles short. Cauda scarcely projecting. Stigma grey ; veins pale yellowish-green ; insertions green ; antennæ as long as body to a little less, thick. Segment i. larger than ii. ; iii. a little longer than vi. ; nearly three times as long as iv., with 110 to 130 sensoria ; iv. with 48 to 59, twice as long as v. ; vi. with basal area about two-thirds length of v. ; flagellum as long as iv. + v. Cauda small, with 15 to 17 long hairs on edges and dorsum. Anal plate large, with many hairs. Cornicles short, broad, cylindrical, about as long, but much thicker than last hind tarsals ; imbricate. Head broad, eyes large and dark. Rostrum long and thin ; pale green, except last 2 segments, reaching to third coxæ.

Length 2.2 to 3 mm.



Fig. 98.—*Anuraphis kochi* Schouteden.

A. Alate ♀ antenna ; B. Cauda and anal plate ; C. Cornicles ; D. Antenna of fundatrix.

*Apterous viviparous female.* Chocolate brown to reddish-brown, dark in middle, with paler dorsal line and paler lines on thorax. Antennæ short, dark. Legs dark. Cornicles black, short. Cauda and anal plate dark, former short. Much domed. Segment i. of antennæ larger than ii. ; iii. nearly twice as long as iv. ; iv. a little longer than v. ; vi. a little longer than iii., basal area about two-thirds of v.

*Length* 2 mm.

FOOD PLANTS. *Pyrus pyrauster* and various Pears (F.V.T.) ; *Cydonia vulgaris* (Schouteden).

LOCALITIES. Wye, v. 15 ; ix. 13 (F.V.T.) ; Germany (Koch) ; Belgium (Schouteden) ; America (Baker).

*Observations.* This is a very marked insect, owing to the long, thick antennæ, which have many sensoria on segments iii. and iv., giving a marked tuberculate appearance. I found the alate return migrants on Pear trees in my garden in September and apterous females in May. The fundatrigenia described by Koch I could not find and since 1913 this insect has only occurred once. The many hairs on the cauda differ from all aphides of this group that I know of. Koch's *pyri* was renamed by Schouteden. The *Aphis pyri* Boyer of Koch is not Boyer's species but the *roseus* of Baker.

ANURAPHIS AMYGDALI Buckton.

*Aphis amygdali* Buckton.

*Aphis persicæ* Boyer (non Sulzer non Koch).

*Aphis persicaricæ* Hartig. ?

Buckton, Mono. Brit. Aphid., II., 104, pl. LXXII., figs. 1-5 (1877) ; Boyer, Ann. Soc. Ent. Fr., X., 14 (1841) ; Mosley, Gard. Chron., I., 684 (1841) ; Amyot, Hist. Nat. Hemipt., 601 (1872) ; Kaltenbach, Mono. Pflanz., 93, 68 (1843) ; Walker, Ann. Nat. Hist. Se. 2, V., 72 (1852) ; Hartig, Germ. Ent. Zeit., III., 370, 12 ; Walker, List. Homop., IV., 981, 80 (1852) ; Koch, Die Pflanz., 61, 9, figs. 78-79 (1857).



*Alate viviparous female.* Head and thorax dark, almost black ; pronotum brownish. Antennæ dark. Abdomen varies from greyish-green to dull rusty-yellow, with a large dark patch posteriorly and 4 black spots on each side ; also some spots or irregular bars on the anterior pale area of abdomen. Cauda small and with anal plate dark. Cornicles dark, almost black. Legs dark, base of femora and most of tibiæ dull tawny yellow. Wing insertions yellowish, stigma pale yellowish ; veins thin, brown to deep brown. Antennæ about as long as body ; segment

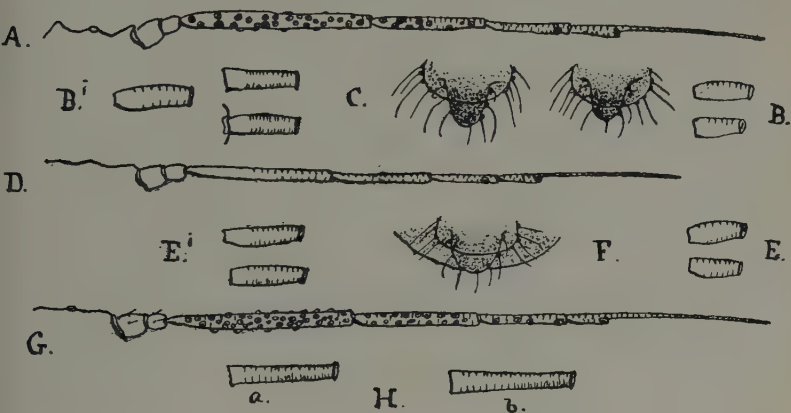


Fig. 99.—*Anuraphis amygdali* Buckton.

A. Antenna of alate ♀ ; B., B<sup>1</sup>, Cornicles ; C. Cauda and anal plate ; D., E., E<sup>1</sup>, F., Apterous ♀ ; G. and H., Antenna and cornicles of *Anuraphis persicæ-niger* Smith.

i. larger than ii. ; iii. much longer than iv., with 32 to 38 sensoria over whole length ; iv. longer than v., with 8 to 12 sensoria ; basal area of vi. about half of v. Cornicles short, variable in length, in some the length of basal area of vi., in others longer, some show a constriction at base, others are basally somewhat swollen ; cylindrical normally ; imbricate. Cauda small, scarcely projecting beyond apex of body, with 3 hairs each side, basal pair short and one dorso-apical. Anal plate rounded, with several long hairs.

Buckton says "the two anal rings show below four small papillæ and one larger one, which last represents the tail." None

of my specimens show this. But there seems no doubt that they are his *amygdali*.

*Length* 2 to 2.8 mm.

*Apterous viviparous female.* Globular, often very shiny; ochreous, tawny, rusty, amber yellow to yellowish-green; head dark; dark irregular bands on thorax; the abdomen with 7 to 8 dark transverse bars, the anterior ones broken in the middle, in some specimens all are broken in the middle, in others all are definite transverse bars, with 4 to 5 black spots on each side; the dark areas may all unite and the entire insect becomes black. Antennæ deep brown, except most of segment iii., which is yellow, except at apex. Cornicles black. Legs dark, almost black, base of femora and most of tibiæ pale yellow to tawny. Antennæ shorter than body; segment i. larger than ii.; iii. longer than iv. and nearly as long as vi.; iv. not quite twice as long as v.; flagellum about four times as long as basal area of vi. Rostrum tawny, apex dark, reaching to or just past third coxæ. Cornicles vary in length, usually much shorter than antennal segment v., now and then nearly as long; cylindrical, in some slightly constricted one side at base; sometimes constricted near apex; frequently curved outwards. Cauda shorter to same length as cornicles, wider, with 2 large lateral pairs of hairs and a small basal pair. Anal plate with some long hairs.

*Length* 1.7 to 2 mm.

FOOD PLANTS. Cultivated Peaches, both in and out of doors; Nectarines.

LOCALITIES. Common all over Britain and Europe.

*Observations.* This Aphid is often a serious pest to Peaches and Nectarines under glass and now and then in the open. It rolls the leaves up into dense masses, especially when the tips of the young shoots are attacked. The older leaves also become curled. The attack is often so severe that the leaves fall off. It is first noticeable in April and May and continues through June, when many become alate and fly away, returning to the Peaches in August and September. Some years, however, I have taken it on the Peach right through the summer into autumn. It is subject to much variation in colour. Some apteræ have dark marks all confluent, except in small lateral areas, so that they

look almost entirely shiny black, others show the black areas as small transverse bars, often with them broken in the median line and then show most prominently 4 to 5 black lateral patches. Now and then colonies almost entirely black may be found. These latter have frequently been mistaken for *Myzus cerasi*. I have also noticed considerable variation in length and shape of cornicles. Buckton figures the species with rather longer cornicles than usually occur. I have often noticed that those taken in Peach houses are darker than those found in the open, but quite black specimens have been sent me from North Wales found out of doors. The young are pale amber colour to dull yellowish and by degrees dark pigment appears which later forms the typical dark areas of the adult. It is much attended by ants, both in and out of doors and the ants carry them about. It is also much parasitised by several *Chalcids*. Buckton bred in October his *Cynips atriceps* (Mono. Brit. Aphid., II., 106, pl. LXXIII., fig. 6). The Black Peach Aphid of America, the *Anuraphis persicæ-niger* of Smith is very similar, but the cornicles are longer and the antennal segment iv. of the alate female has sensoria upon it.

According to Mordwilko the *persicæ* of Koch equals *farfaræ* Koch and *pyri* Koch. This does not seem to me to be so.

#### ANURAPHIS ANGELICÆ Koch.

Koch, Die Pflanz, 52, 53, figs. 66, 67, pl. IX (1854).

*Apterous viviparous female.* Greyish-black, with some whitish meal. Egg shaped. Head dark grey to almost black, some dark transverse bars on posterior of abdomen. Antennæ yellowish-grey, black at base and on segments iv. to vi. Cornicles black. Anal plate and cauda dark. Legs yellowish-grey, femora dark; apices of tibiæ dusky; tarsi dark. Antennæ about half length of body. Some specimens show a deeper grey-black line on each side and 2 darker thoracic bars. Antennal segment i. wider but no longer than ii.; iii. broad and rather short, a little shorter than iv. and shorter than flagellum of vi.; iv. and v. about equal; basal area of vi. not quite so long as v., flagellum about twice as long; a few hairs on i. and ii.; 2 on one side of iii.; 1 on iv. and v. and one on basal area of vi. Rostrum rather broad, reaching to about third coxæ, yellowish-grey, apex dark; apical segment scarcely longer than penultimate, narrower and acuminate. A

lateral papilla each side of pronotum. Cornicles rather thick and short, about as long as antennal segment iii., longer than cauda, expanding basally; imbricate. Cauda short, thick, slightly broader than cornicles at their base, 2 rather short hairs each side and 1 dorso-apical. Anal plate nearly quadrilateral, a little larger than cauda, with many short hairs. Very short, scattered hairs on body, which become longer towards apex. Legs moderately long, rather thick; a few hairs on femora, many and longer on the tibiæ.

*Length* 1.5 to 1.8 mm.

*Alate viviparous female.* "der geflügelten Mütter ist im Wesentlichen nur zu bemerken, dass das dritte, vierte und fünfte Glied der Fühler eng und deutlich geringelt sind. Beine und Honigröhrchen kommen mit denen der ungeflügelten ziemlich überein, nur sind erstere etwas länger. Ein ungemein kleines Afterstielchen ist in gewisser Richtung bemerkbar. Die Farbe ist sehr abweichend. Kopf, Halsring und Vorderleib glänzend schwarz, hinten an dem Halsringe ein Reifchen rostgelb, bei ältern Stücken doch kaum bemerkbar. Hinterleib heller rostgelb, mitschwarzen oval en Seiten fleckchen und schwarzen Honigröhrchen, auf dem dritten und vierten Ringe ein gemeinsschaftlicher, grosser Fleck, auf den folgenden ein Bogenstreif und der Afterring braun-schwarz. Erstes Hüftenglied schwarz, zweites und die Beine rostgelb, die Schienen etwas bräunlich angelaufen, die Endhälfte der Schenkel, die Spitze der Schienen und die Beine rostgelb, die Schienen etwas bräunlich angelaufen, die Endhälfte der Schenkel, die Spitze der Schienen und die Tarsen schwarz. Flügel wasserhell, violett spielend; die Hauptader und die Wurzel gelb; die Randmalzelle hell rauchgrau" (Koch).

*FOOD PLANTS.* *Angelica sylvestris*; *Hedera helix*; *Arctium lappa*; *Cicuta virosa*.

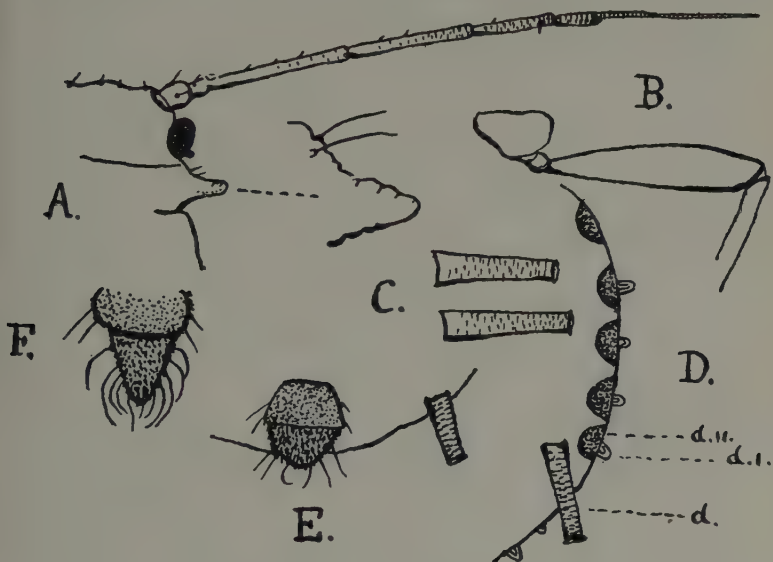
*LOCALITIES.* Barmouth, vi. 11 on *Angelica* (F.V.T.); Bangor, xi. 21 on Ivy (Walton).

*Observations.* I have only found this insect once, on *Angelica* and Dr. C. L. Walton has sent it to me from Ivy, taken in company with *Aphis hederæ* Kalt. and two other species, *Aphis pseudohederæ* and *Rhopalosiphoninus waltoni* Theobald. It can easily be demarked from the other Ivy species by its short cauda and cornicles and by the thicker antennæ. It is a true *Anuraphis*.

## ANURAPHIS CARDUI Linnæus.

*Aphis cardui* Linnæus.*Aphis onopordi* Schrank.*Aphis chrysanthemi* Koch.*Aphis lata* Walker.? *Aphis jacobææ* Koch.

Linnæus Fn. Suec., 988 (1746) ; Syst. Nat. Ed. X., 452 (1758) ; Scopoli, Ent. Carn., 138, 404 (1763) ; Fabricius, Ent. Syst., IV., 214, 16 (1794) ; Syst. Rhyng., 296, 16 (1803) ; Schrank, Fn. Boica, 121, n. 12, 36 (1801) ; Kaltenbach, Mono. Pflanz., 115 (1843) ; Walker, List. Homop. (B.M.), IV., 1,009, 149 (1852) ;

Fig. 100.—*Anuraphis cardui* Linnæus.

A. Head and antenna of apterous ♀; B. fore leg; C. Cornicles; D. Abdomen, with papillæ d.1., lateral spots d.2., and cornicle d.; E. Cauda, anal plate and cornicle of larva; F. of adult.

Koch, Die Pflanz., 75, 18, pp. 95-98 and 73 (1854) ; Buckton, Mono. Brit. Aph., II., 92, pl. LXVIII. (1877) ; Schouteden, Aph. Belg., 218 (1906) ; Walker, Zool., VIII., App. CIII (1850) ; VII., 103. App. (1849) = *lata* ; Patch, Bull. 233, 263-264, fig. 92 L-M, fig. 95 F ; Davidson, Journ. Eco. Ent. v. 407 (1912) ; Niessen, Marcellia, vii, 14 (1908).

*Apterous viviparous female.* Deep green, tawny yellow, rusty ochreous, brown, with a large black dorsal patch on abdomen, 2 to 3 black bars behind; small dark lateral spots and some broken black marks in front of the dorsal plate; in some the black areas all merge and the insect is quite black. Head and thorax with dark variable marks; in a few the head is tawny-brown. Antennæ about half length of body; base and apex dark, mid area same colour as body; segment i. wider than ii.; iii. much longer than iv. and a little shorter than vi.; iv. longer than v.; vi. with base nearly half of v.; flagellum a little longer than iii. Cornicles black, thick, cylindrical, about as long as iv. Cauda black; three hairs each side, about as long as hind tarsi. Anal plate black, more or less quadrilateral. Rostrum rather thick, reaching to or past third coxæ. Legs same colour as body; apices of femora and tibiæ and the tarsi black; femora with a few, tibiæ with many hairs. Some specimens show large black lateral spots and some smaller ones and pronotal and lateral abdominal papillæ.

Length 2 to 2.3 mm.

*Alate viviparous female.* Yellowish-green ochreous or tawny with black markings. Head and thorax black; collar paler.

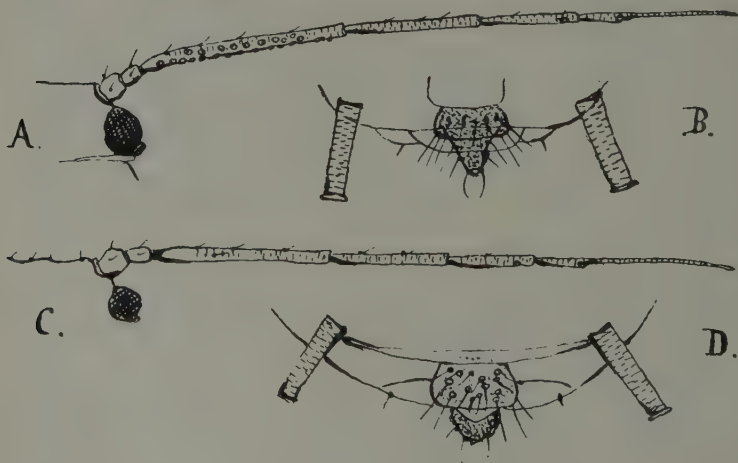


Fig. 101.—*Anuraphis cardui* Linnæus.

A. Head and antenna of alate ♀; B. Cauda, anal plate and cornicles of A.; C. and D. of apterous ♀.



Abdomen with a large black central patch and 2 marked black bars behind, 3 large black lateral spots and below them 4 smaller ones. The black markings may so encroach on one another that the whole body becomes dark, the lateral spots alone showing up. Antennæ black, not quite so long as the body; segment i. larger than ii., iii. longer than iv., not quite so long as vi., with 27 to 32 sensoria; iv. longer than v., now and then 1 or 2 sensoria; base of vi. about half of v.; flagellum about as long as iii. Rostrum with dusky apex, reaching to third coxæ. Cornicles black, cylindrical, broadening basally, imbricate, about as long, but much thicker than iv. Cauda small, dark, not quite so long as hind tarsi, with a few hairs. Anal plate black, with several hairs. Legs same colour as body, apices of femora and tibiæ and the tarsi dark. Wing insertions yellowish-brown; stigma pale brown; veins yellow-brown.

*Length* 2 mm.

FOOD PLANTS. *Carduus* spp.; *Senecio* spp.; *Chrysanthemum leucanthemum* and *Chrysanthemum* spp.; *Matricaria* spp.; *Anthemis maritima*; Plum ? (Patch); *Oenothera muricata* (Niessen).

LOCALITIES. General over England and Wales and Europe; America (Patch and Davidson).

*Observations.* A very common and variable species, some apteræ being all shiny black. It clusters in dense masses up the stalks of Thistles, Chrysanthemum and Matricaria and gets over the flowers and some may be found on the leaves. Alatæ occur from July to September; in August of some years all seem to become alate and to fly away. It is much attended by ants of several species. It is often heavily parasitised by Hymenoptera, whole colonies being destroyed by them. The larvæ are bright green and the nymphæ green with dusky wing-cases. Schrank's *onopordi* is evidently *cardui* and so is Koch's *chrysanthemi*. Walker's *lata* is described as follows:—"Apterous female. Body small, convex, black, shining, nearly triangular, narrow in front, very broad behind; the sides are reddish, the under side dark green; antennæ yellow with black tips and shorter than the body; rostrum pale green, with black tip; the tubes are about  $\frac{1}{5}$  to  $\frac{1}{4}$  of the length of the body; legs yellow and of

moderate length ; the tarsi and tips of the thighs and of tibiae black. Near Newcastle in the autumn (Mr. Hardy). On groundsel (*Senecio vulgaris*)."

The black *Aphis rumicis* also occurs on Thistles but can at once be told by its long cauda and dull appearance. Lefroy (Ind. Ins. Life, 747, 1904), records *cardui* on Pigeon Pea in India, this probably refers to *laburni*.

Haviland, Ent. Mo. Mag., 54, 201 (1918) records it on thistle from Odessa and places it equal to Koch's *myosotidis*.

Patch refers to it on Plum and Thistle in Maine.

#### ANURAPHIS CYNARIELLA Theobald.

Ent. Mo. Mag., LX., Se. 3, p. 125, fig. 2 (1924).

*Apterous viviparous female*. Apparently deep brownish-green, with very dark cornicles and cauda. Antennae deeper colour than body. Fore and mid legs with pale femora and tibiae, except at apices ; hind legs darker ; tarsi dark. Antennae shorter than body ; segment i. larger than ii. ; iii. a little longer than iv., much shorter than vi. ; iv. and v. about equal ; vi. with base half of v. ; flagellum longer than iii. ; a few hairs on i. to v. Head

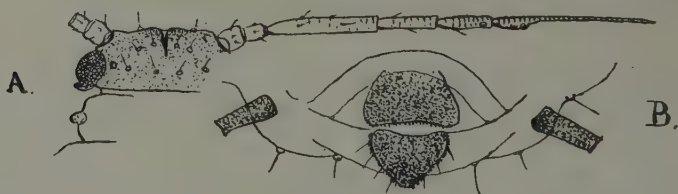


Fig. 102.—*Anuraphis cynariella* Theobald. apterous ♀.  
A. Head and antenna ; B. Cornicles, cauda and anal plate.

darker than body. Eyes large ; ocular processes prominent. Rostrum broad, apex dark, reaching to third coxæ. Cornicles rather short and thick, cylindrical, expanding basally, as long as segment iv. of antennae ; imbricate. Cauda small, roughly triangulate ; a few hairs each side. Legs rather short and thick ; femora and tibiae with fine scattered outstanding hairs. Scattered hairs on head and a few larger ones on body. A large papilla each side of pronotum ; one prominent one each side of abdomen

and another each side between cauda and cornicles. Skin with fine, irregular, reticulations.

Length 2 mm.

FOOD PLANT. Globe Artichoke (*Cynara scolymus*).

LOCALITY. Bangor, N. Wales, 9 vi. 1921 (C. Walton).

Observations. Described from a number of spirit specimens, the colour having partly gone. Very close to *cardui*, but with much shorter cornicles.

# ANURAPHIS INSITITIÆ Koch.

*Aphis insititiæ* Koch.

Koch, Die Pflanz., 58, 7, figs. 74-75 (1854).

*Apterous viviparous female*. Globular, much domed, more or less shiny; a deep rusty red, with darker head and two dark bands on thorax, six large dorsal median broad bands, confluent and sometimes covering most of the body, except just at the sides; several black lateral spots, varying from 5 to 7 before cornicles, 1 caudad of them. Antennæ short, about one-third length of body to a little larger; segments iv. to vi. dark; i. larger and darker than ii.; iii. longer than iv. and often scarcely separated from it; iv. a little longer than v.; vi. with basal area as long as v.; flagellum small, scarcely longer than basal area. Rostrum, dark, reaching past second coxæ. Cornicles very short and broad, pale rusty yellow to yellow, in some dusky or black apices, bases expanded, about as long as antennal segment v; some broader than others. Cauda dark, about as long as cornicles, broader, a pair of long outstanding bristles and a longish one on each side, closely

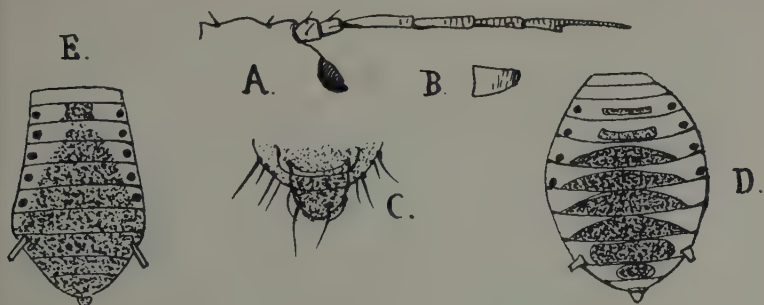


Fig. 103.—*Anuraphis insititiæ* Koch.

A. Head of apterous ♀; B. Cornicle; C. Cauda; D. Body markings; E. Body of alate ♀.

appressed. Legs rather short, rusty red to dull brownish yellow or yellow ; apices of femora and tibiæ dark ; tarsi dark ; tibiæ rather broad. Eyes dark.

*Length* 1.5 to 1.8 mm.

*Alate viviparous female.* " Head and thorax black ; abdomen green with a large black patch commencing on the third segment and extending back to the cauda ; five black lateral spots. A pale band on each border of pronotum. Antennæ black, as long as body. Cornicles black, rather long. Legs green, apices of femora and tibiæ and the tarsi dark ; base of femora may be yellowish." (Koch.)

FOOD PLANT. Bullace (*Prunus insititia*).

LOCALITIES. Wye, v. 14, 17 iv. 20 (F.V.T.) ; Germany (Koch).

*Observations.* I have found this species only once in my garden on a yellow Bullace Plum. It is very marked when apterous, being globular and shiny ; very variable in colour, owing to the dark markings encroaching on the rusty red areas. Both antennæ and cornicles abnormally short. They seem to hatch early and are found at the bases of unopened leaf and blossom buds and later near the young blossoms and there they produce green young, which later pass to the flowers and leaves and cause some leaf-curling. Not having been able to obtain alatae I have appended Koch's main characters.

Macchiati considers this a synonym of Boyer's *persicæ*. It appears to me to be distinct, the apterous ♀ having distinct dorsal bands and the alate ♀ a bright green abdomen, with a black patch.

ANURAPHIS TULIPÆ Boyer.

*Aphis tulipæ* Boyer.

*Aphis gladioli* Felt.

Boyer, Ann. Soc. Ent., Fr., X., 167 (1841) ; Felt, New York St. Mus., Mus. Bull., 134, 24th Rept. State Ent., 19, figs. 6 to 9 (1909) ; Van der Goot, Tijds. v. Ent., 56, 103 (1913) ; Theobald, Bull. 3, S.E.A. Coll. (Res. Dept.), 3-7, fig. 1 (1923).

*Alate viviparous female.* Head brown ; thorax dark brown to black lobes varying from very deep brown to black ; abdomen pale fawn to almost kid glove white, a few yellowish of various shades, or tinged with pink ; dark dorsal and lateral markings,

notably a varied shaped dark dorsal patch, on segments 4 to 6 or 7. Antennæ, cauda and anal plate fuscous, former with some pale or yellow areas. Legs pallid, now and then with yellowish tinge; apices of femora and tibiæ dusky; tarsi dark, venter pallid yellow or white, a dark area on the mesonotum; apex of abdomen with fuscous bars. Antennæ shorter than body; segment i. larger than ii.; iii. about as long as vi., rather thick, with 48 to 60 sensoria over whole length; iv. wider and a little longer than v., with 3 to 14 sensoria (Felt says very abundant on 3 and 4, but only figures 36 on iii. and 6 on iv.); vi. with basal area not quite

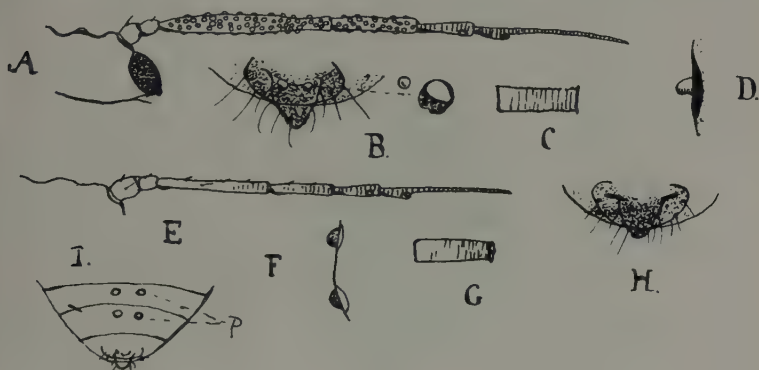


Fig. 104.—*Anuraphis tulipæ* Boyer.

A. Head and antenna of alate ♀; B. Cauda and anal plate; C. Cornicle; D. Lateral papilla; E. Antenna of apterous ♀; F. Lateral papilla; G. Cornicle; H. Cauda and anal plate of apterous ♀; I. Apical abdominal tubercles (p).

so long as v.; flagellum shorter than iii. Eyes large, deep red. Rostrum reaches well past third coxæ. Cauda small; 2 hairs each side and 1 dorso-apical. Anal plate rounded, with many hairs. Cornicles rather short, cylindrical, narrow, varying in shape, some expanded basally, but always with a marked constriction one side of base, about one and a half to twice as long as cauda and about as long to longer than hind tarsi. A marked, blunt papilla behind posterior legs on each side and a small one before cornicles. Two pairs of small sub-median dorsal papillæ at apex of abdomen. Stigma grey; veins pale greenish-brown; insertions pallid.

Length 1.7 mm.

*Apterous viviparous female.* Pale fawn to almost kid glove white, a few tinged with pale pink or brown, yellowish brown or pallid green; head and apex of body may be deeper coloured. Antennæ pale, apices dark, also dusky bands on apices of segments iii. to v. Cauda, anal plate and cornicles fuscous. Apices of tibiæ and tarsi dusky. Eyes black to deep red. Rostrum pale, apex dusky. Antennæ less than half body; segment i.



Fig. 105.—*Anuraphis tulipæ* Boyer (apterous female).

larger than ii.; iii. about as long as vi., more than twice as long as iv.; iv. longer than v.; basal area of vi. smaller than v.; flagellum about as long as iv. + v.; several prominent hairs on iii. Cauda small, scarcely projecting beyond abdomen, with 2 hairs each side and 1 dorso-apical. Anal plate rounded, with several long hairs. Cornicles cylindrical, expanding basally, about three times as long as cauda and nearly as wide at base, much longer than hind tarsals. Rostrum reaches third coxæ. Abdominal lateral papillæ small; on last segment 2 large papillæ and a small one each side with a marked hair; 4 small dorsal apical papillæ. A few cephalic hairs. Short hairs scattered over body.

*Length* 1.7 to 2 mm.



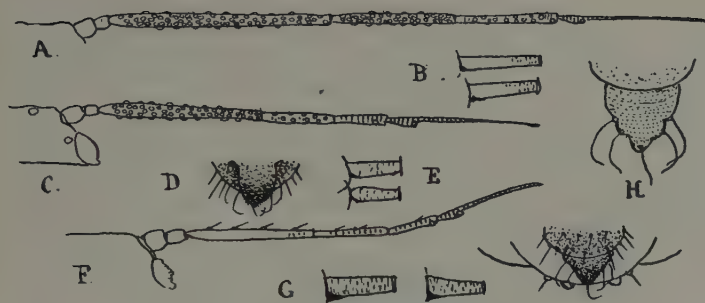


Fig. 106.—*Anuraphis tulipæ* Boyer.

A. Antenna; B. Cornicles of male; C. Head and antenna; D. Cauda and anal plate; E. Cornicles of alate ♀; F. G. H. of apterous ♀.

**Male.** Alate. Head and thorax brown. Abdomen fawn colour, a dark dorsal area and dark lateral spots. Antennæ dark brown, much longer than body; segment i. larger than ii.; iii. longest, with 54 to 60 sensoria; iv. a little longer and thicker than v., with 42 to 48 sensoria; v. with 12 to 16; basal area of vi. nearly quarter of v.; flagellum, moderately long. Cornicles cylindrical, rather thin, nearly as long as antennal segment v.; rather more than three times as long as hind tarsus. Cauda small, scarcely projecting, with 2 hairs each side. Penis blunt, yellow; claspers black. Rostrum not reaching second coxæ.

*Length* 1.5 mm.

**FOOD PLANTS.** *Tulipa*, *Gladiolus*, *Lilium*, *Scilla*, *Chionodoxa*, *Crocus*; Carrot Roots; Parsley roots; *Iris*.

**LOCALITIES.** London, x. 21 on stored bulbs; Brandon, Suffolk, 19 ix. 16; Wye, 7 vii. 05 and 12 viii. 11; Hythe, Kent, x. 21; Berkhamsted, vii. 12; Chelmsford, 19 ix. 16; Exeter, 7 ix. 09 and on many bulbs sent with no locality or salesman given (F.V.T.); Wisley, Kew, Cambridge, Torquay, Hastings and London (Laing); Glasgow (Ormerod); Germany (Koch?). Recorded by Laing from Wellington, New Zealand, 23 vii. 23, on bulbs sent from Scotland; America (Felt); Bermuda, 23 vi. 25 (L. Ogilvie).

**Observations.** This very marked and pretty Aphid was first described by Boyer in 1841 and re-described by Felt as *Aphis gladioli* in 1909. Felt says, "Gladioli bulbs are kept by growers

in large warehouses, the temperature being maintained at about 50° throughout the winter. The Aphid is evidently unable to breed under these conditions. As spring advances and the houses begin to warm up in March, the Aphides appear in large numbers, reproducing so abundantly that the window frames and sills may become literally covered with wings and bodies of the plant lice. It is comparatively easy in a badly infested



Fig. 107.—Carrot split by *Anuraphis tulipæ*. Boyer.

house to sweep up a gill of wings and exuviae from under one window. This plant louse multiplies freely upon bulbs, usually being massed around the origin of the roots and sometimes nearly covering the entire under surface. Breeding evidently continues from sometime in March, until into July, with the production of numerous winged individuals the latter part of July, at least in the case of bulbs submitted for examination, though winged females undoubtedly occur earlier in the season under warehouse conditions. By July 28th winged females had entirely disappeared in our breeding cages on the bulbs; later all disappeared. An investigation about the middle of August resulted in finding no living Aphids in the storage warehouses or upon the plants in the field. It is stated that when digging in October a few plant lice may be found upon the bulbs. These evidently remain in a dormant condition till the house warms up in the spring as described above." This Aphid was sent me in 1921 by Mr. J. C. F. Fryer, from stores of bulbs in London and again specimens of it were sent me on bulbs by the Ministry of Agriculture in 1923. I kept the aphides sent me by Mr. Fryer in 1921 in the laboratory alive on bulbs until December 20th and during that time several alate broods appeared and settled down on other bulbs put with them. At the end of November I found several males, but I could never find any oviparous females. The alatae were not active and I noticed in the breeding jars that they flew to the light. The males on the other hand were very active. A slide sent me by Mr. F. Laing of the British Museum made from specimens taken on bulbs in New Zealand imported from Scotland is the same insect. Specimens kept under observation showed a decided preference for the bulbs of *Tulips*, *Gladioli* and *Lilies*, but they would go to the corms of *Crocus* and some to *Scilla* and Snowdrops and in one case I got them to breed on potatoes. Boyer found this insect on Tulips lifted for storing in November. The many plant lice which I have found attacking Carrots and Parsnips under ground and causing the former to split are exactly the same as those found on bulbs. The Carrot Aphid attacking the roots that I have recorded as *dauci* and *carotæ* are the same as the *tulipæ* of Boyer. The true *dauci* or *carotæ* is distinct. On bulbs and corms when present in any numbers they do a good deal of harm. The worst attacked ones do not send up any flower heads at all and some bulbs rot right away.

Attacked bulbs should be fumigated with tobacco shreds, but the best treatment is to run the bulbs through a bath of nicotine and soft soap and dry them gradually. The quantity I finally used was  $\frac{1}{2}$  oz. of nicotine (95 p.c.) ; 2 ozs. of soft soap to 10 gallons of water. Two minutes immersion is sufficient. The hot water treatment used for killing Eelworms, *Merodon* larvæ and Bulb Mites will also kill them. Stenton has found that fumigation with p-dichlorobenzene a satisfactory method. On lifting bulbs, if any signs of *Aphis* appears they should be carefully killed before the bulbs are stored. The Bermuda specimens were found on Parsley roots.

This was the type of Van der Goot's genus, *Dentatus*, but in spite of the small apical dorsal papillæ, it is so closely related to other Anuraphids that I include it here.

#### ANURAPHIS DAUCI Fabricius.

*Aphis dauci* Fabricius.

*Aphis carotæ* Koch.

*Aphis assueta* Walker ?

Fabricius, Syst. Ent., 737 (1775) ; Koch, Die Pflanz., 112, fig. 149 (1845) ; Walker, Zool., VII., App. xlix. (1849) ; List. Homop. (B.M.), IV., 1,033, 296 (1852) ; Ormerod, Rept. Inj. Ins., 1883-4 (1884) ; Theobald, Rept. Eco. Zool., 1905, 55, 61 (1906) and for 1909, 76 (1910).

*Apterous viviparous female.* Green, with black short cornicles and black cauda ; head black ; legs and antennæ yellowish, apices of antennæ and femora and tibiæ dark, also tarsi, also dusky rings at apex of body ; body often with whitish meal, shiny beneath. Antennæ short, scarcely more than half of body. Cornicles very short, scarcely longer than thick. Cauda nearly as long as cornicles. Rostrum reaching to third coxæ. Four small papillæ each side of body.

*Length* 1.5 to 1.8 mm.

FOOD PLANT. Carrot.

LOCALITIES. Wye, viii. 01, viii. and ix. 05 ; 7 viii. and 14 viii. 11 ; Germany (Koch).

*Observations.* I have only seen this species a few times and in all cases most had been killed by Chalcids and the dead skins were sticking on to the leaves and flower heads of the carrots. It evidently bears a strong resemblance to *tulipæ*, but its bright green colour and dark head separates it. Fabricius' original description is as follows :—" Antennæ nigræ, basi pallidæ. Caput et thorax fusca. Abdomen viride, lituram nigra. Corniculi brevissimi, nigri. Pedes nigri." From the Umbels of *Daucus carota* Koch describes an apterous female from Carrots as *Aphis carotæ*. This appears to me to be the same as Fabricius' species. In 1905 in Kent there was a bad attack of this aphid on the leaves and heads of Carrots, at one time it looked as if all the foliage would die off, but suddenly they all or nearly all became parasitised. Miss Ormerod gives a short account of this Aphid from a correspondent's notes, from near Glasgow, who stated that " about the time the worm (maggot of the Rust Fly) had exhausted itself Green Fly began on the leaves, also on the west side where the crop was weakened by the worms and it gradually spread over the whole plot, reducing the leafage by at least an average of one-half."

This may possibly be an aerial form of Boyer's *tulipæ*, if so the latter name must sink as a synonym of *dauci*.

#### ANURAPHIS HELICHRYSI Kalténbach.

*Aphis helichrysi* Kalténbach.

*Aphis balsamitæ* Muller.

*Aphis prunina* Walker.

*Aphis chrysanthemi* Walker.

*Aphis bartsiæ* Walker.

*Aphis apposita* Walker.

*Aphis myosotidis* Koch.

*Aphis petasitidis* Buckton.

*Aphis pruni* Buckton etc.

*Brachycaudus helichrysi* V. d. Goot.

*Brachycaudus pruni* Das.

*Anuraphis abrotaniella* Theobald.

*Anuraphis cinerareæ* Theobald.

*Anuraphis glaucifolia* Theobald.

*Anuraphis helichrysi* var. *warei* Theobald.

*Anuraphis helichrysi* var. *centauriella* Theobald.

*Anuraphis cyani* Theobald.

Kaltenbach, Mono. Pflanz., 102 (1843); Koch Die Pflanz., 138, figs. 182, 183 and 57, 6, figs. 72 and 73 (1854); Muller, Zool. d. prodi, 109, 1262 (1776); Walker, Zoologist, VI., 2250 (1848); VII., xxxviii. (1849); Ann. Mag. Nat. Hist., VI., 2, 120, 99 (1850); List. Homop. (B.M.), 998 (1852); Buckton, Mono. Brit. Aphid, II., 102, Pl. LXXII. and 69, Pl. LVIII., figs. 1 and 2 (1877); Schouteden, Ann. Soc. Ent. Belg., XII., 221 (1906); Schouteden, Mém. Soc. Ent. Belg., XII., 224, 38; 225, 45 (1906); Theobald, Insect Pests of Fruit, 379, figs. 251-255 (*pruni*), 1908; Walker, Zoologist, VII., 49 (*bartsiae*) and 56, App. (1849) = *chrysanthemi*; Theobald, Entomologist, LII., 160 (1919) = *abrotaniella*; Bull. d. l. Soc. Ent. Egypt, 54, 1922 (1923) = *cinerareæ*; Bull. 3, S.E.A. Coll. (Adv. and Res. Dept.), 7-11, figs. 2-5 (1923) = *warei*; Ent. Mo. Mag., Se. 3, IX., 104, 3, fig. 3 (1923) = *glaucifolia*; Ent. Mo. Mag., Se. 3, LIV., 230 (1921) = var. *centauriella*; Blanchard, Physis., VI., No. 21, 50, fig. 17 (1922);

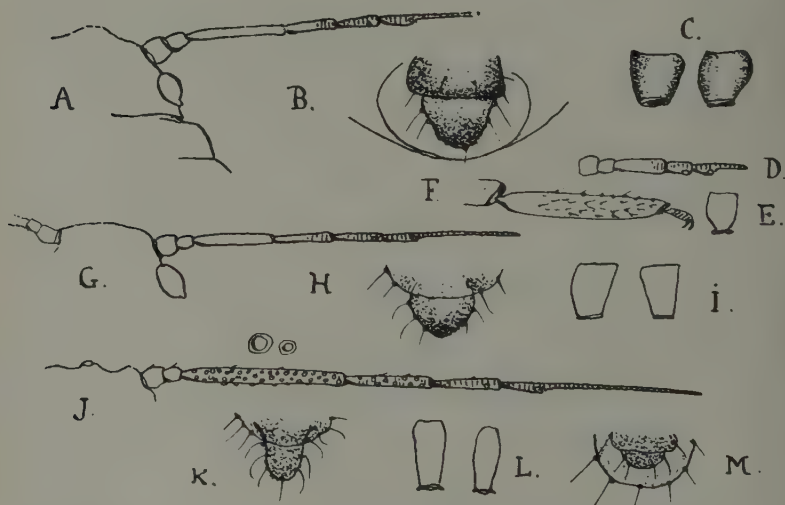


Fig. 108.—*Anuraphis helichrysi* Kaltenbach.

A. B. and C., Head and antenna, cauda and anal plate and cornicles of Fundatrix; D. Antenna; E. Cornicle; F. Hind tibia of young oviparous ♀; G. H. I., Mature viviparous ♀; J. K. L. M., Alate ♀ on *Prunus*.



Das, Aphid. Lahore, Mem. Ind. Mus., IV., 222 (1918); Hall, Aphid. Egypt, 11 (1926); Theobald, Bull. Soc. Roy. Egypt, VII., 57 (1922) (= *cyani*).

*Apterous viviparous female* (fundatrix). From *Prunus*. Globular, much domed, deep brown to purplish-brown, with now and then paler lines. Antennæ and legs much the same colour as body, in some pale on segments iii. and iv.; i. broader than ii.; iii. nearly twice as long as iv. and about same length as vi.; iv. and v. about equal, the latter dark at apex; flagellum short, about one and a half length of base. Eyes deep reddish-black. Rostrum reaches to second coxæ. Legs rather short and thick. Anal plate and cauda hidden under body. Cornicles very short, about same length as cauda, broadened at base; no imbrications.

*Length* 1.7 to 2 mm.

*Apterous viviparous female* (second stage on *Prunus*). Green, more or less shiny, some olive brown to almost ochreous-yellow. Oval, often attenuated caudally. The shiny skin often coated with fine mealy substance. Eyes brown. Antennæ, cauda and anal plate green, the former dusky at apices. Cornicles very small, pale brown to olive green. Rostrum pale green, apex darkened. Occasionally the abdomen has darker lines running lengthwise. Antennæ very short, only about one quarter length of body, but now and then in later stages one-third; segment i. larger than ii.; iii. longer than iv., shorter than vi.; iv. slightly longer than v.; base of vi. about as long as v., flagellum twice or more length of base. Rostrum reaches second coxæ. Cornicles short and thick, expanding basally; no imbrication. Anal plate and cauda hidden under abdomen as a rule, but in fully mature specimens the latter may project; 2 hairs each side of cauda. A few hairs on posterior of body.

*Length* 1.6 to 2 mm.

*Alate viviparous female* (on *Prunus*). Head and thorax dark brown to black; lobes shiny black. Abdomen green, with black dorsal patch posteriorly, one dark transverse line usually in front of it and 2 behind; four dark spots each side. Antennæ deep brown to black. Legs yellowish-green, apices of femora and tibiæ and the tarsi dark. Cauda green. Cornicles dark green, apices dark, some paler than others. Sterna of thorax black and a black spot

at apex of body on venter. Wing insertions pale; stigma greyish-green; veins pale brown. Antennæ nearly as long as body,

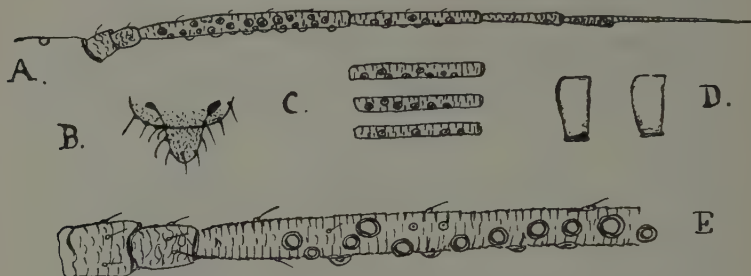


Fig. 109.—*Anuraphis helichrysi* Kaltenbach.

A. Antenna of alate ♀ return migrant to *Prunus*; B. Cauda and anal plate; C. Varieties of segment iii; D. Cornicles; E. Enlarged segment iii. of antennæ.

segment i. broader than ii.; iii. long, about as long as vi., with 29 to 35 sensoria; iv. much longer than v., with 13 to 18 sensoria, some larger than others; v. not quite so long as base of vi., the latter about one-quarter of the flagellum. Rostrum reaches second coxæ. Cauda bluntly elongate, 3 hairs each side and 1 dorso-apical, about as long as cornicles. Anal plate rather flattened, rounded apically, many hairs. Cornicles short, cylindrical, not so long as antennal segment v., no imbrications. Tibiæ with small hairs. Head and body with very short scattered hairs.

*Length* 1.4 to 1.7 mm.

*Apterous viviparous female* (on herbaceous plants). Bright green to yellow-green, pale yellow, pale ochreous white, a few orange or pale reddish, oval or elongated oval; shiny or dull. Antennæ green, except at apices; shorter than body. Cornicles green, very short and thick. Cauda small, green. Legs green; tarsi dusky. Body with numerous hairs. Eyes dark. Antennæ about one-third of body; segment i. a little longer than ii.; iii. very short, very little longer than vi.; iv. longer than v.; vi. with basal area as long as v.; flagellum nearly four times as long as base. Rostrum reaches to between second and third coxæ. Cornicles bluntly conical, about as long as antennal segment iii. and a little longer than cauda; some dusky at apices, some dark

all over. Cauda small, three hairs each side. Body hairs caudad of cornicles long.

*Length* 1.1 to 1.9 mm.

Numerous variations occur, in some the apices of the tibiae are dark, the cornicles dusky and the antennæ not half length of body and with 2 hairs each side of cauda (*chrysanthemi* Wlk.). In *cineraræ* Theob. the cornicles are the same colour as body, i.e. yellow, green, orange or reddish. In *warei* Theob., the antennæ are scarcely half length of body, cauda with 2 pairs of lateral hairs.

*Alate viviparous female* (intermigrant). An alate brood which occurs on *Myosotis*, and many other plants and which fly to other plants of similar or different species. Very similar to the fundatrigenia, but with rather more sensoria on segment iii. and those on iv. varying from 0 to 12 and rather more black on abdomen.

*Alate viviparous female* (return migrant). Very similar but more pale colouring on the abdomen, often almost yellow, instead of green, etc. Segment i. of antennæ wider than ii.; iii. with 13 to 40 sensoria of varied sizes; iv. with 1 to 9 sensoria. Cauda, anal plate and cornicles dark. The latter more regular and thicker than in former alatae, but some bent in at base on one side, about as long as cauda. Cauda bluntly acuminate; three hairs each side and 1 dorso-apical.

*Length* 1.7 to 1.9 mm.

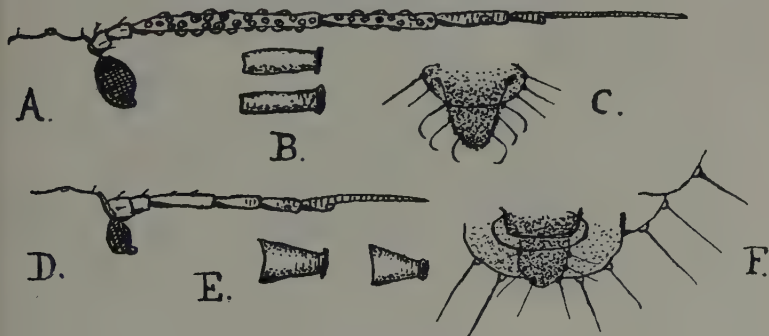


Fig. 110.—*Anuraphis helichrysi* Kaltenbach  
(*myosotidis* Koch).

A. Head and antenna of alate ♀; B. Cornicles; C. Anal plate and cauda; D. Head and antenna; E. Cornicles; and F. Anal plate and cauda of apterous ♀.

*Oviparous female* (On *Prunus*). Apterous. Yellow to yellowish-green; the dark ova shine through the skin. Antennæ short, less than one-third of body, of 5 segments; i. a little longer than ii.; iii. twice or more as long as iv. and only slightly shorter than v.; basal area of v. nearly as long as iv.; flagellum short, about as long as iii.; v. somewhat darkened. Rostrum yellow, rather short and thick, reaching nearly to second coxæ. Cornicles short and thick, not quite so long as antennal segments i. and ii. Cauda and anal plate green, the former small and hidden. Apex of body with some long hairs. Legs rather short and thick, especially the hind pair; hind tibiæ very broad, with short hairs and some longer outstanding ones at the sides. Eyes, large, red.

*Length* 1 mm.

**FOOD PLANTS.** All kinds of Plums, Damsons, Sloes, Hawthorn; Peaches; *Prunus padus*; *Myosotis* spp.; *Achillea millefolium*; *Senecio jacobæa*; *S. vulgaris*; *Matricaria* spp.; *Chrysanthemum* spp.; various *Umbelliferae*; *Acroclinium roseum*; *Rumex* spp.; *Petasites vulgaris*; *Cynoglossum officinale*; *Cineraria* sp.; *Trifolium*; *Filago germanica*; *Glaucium luteum*; *Artemisia abrotani*; *Vinca major*; *Echium vulgare*; *Lycopsis arvensis*; *Bartsia viscosa*; *Ageratum conyzoides* (India) and many other plants.

**LOCALITIES.** Widely distributed over Great Britain and Ireland; Continental Europe; South America; N. America; Japan; India; Egypt.

*Observations.\** One of the commonest Aphides found on Plum, Damsons, Sloe and Bullace, from which in summer it migrates to many herbaceous plants. In India Das records it as attacking Peach trees. It is usually called the Leaf Curling Plum Aphid. In many years it does much harm, often quite ruining the crop. It causes the leaves to curl up and later they turn brown and fall off the trees and the fruitlets drop off. Not only are the leaves and fruit ruined for the year, but the trees have a serious setback for next season. In many instances after a bad attack the tips of the shoots are killed and when the disease has persisted for two

\* The writer is of opinion that the correct name of this insect is *Anuraphis padi* Linnaeus (vide Appendix).

or three years the trees may actually die. The sexual forms occur on the Prunes in autumn and the oviparous females lay their eggs at the bases of the buds and amongst the bud clusters. At first the ova are deep green, later becoming black. The eggs hatch in



Fig. III.—Plum shoot attacked by *Anuraphis helichrysi* Kalt.

late February and early March. The young from the eggs are dull green and by degrees grow into the fat purplish-brown "Mother Queens," which shelter at the bases of the buds in characteristic manner. The fundatrices produce green young which at once commence to feed on the unfolding leaves and even blossoms. These become mature early in April and

their progeny, which are numerous, shelter under the already curling leaves and roll them tightly up in lateral folds. In late May and early June the green apteræ give rise to young which rapidly become nymphæ and during those months they assume wings and fly away to settle and live on various herbaceous plants for the summer, especially on Forget-me-Nots (*Myosotis spp.*); various *Umbelliferae*; *Achillea millefolium*; *Senecio*; *Trifolium*; *Artemisia* and many others. The insects described from these



Fig. 112.—*Anuraphis helichrysi* (*abrotaniella*).

A. Head and antenna of alate viviparous ♀; × 45. B. Cauda, anal plate. C. Cornicles.

various hosts plants I consider all the same. On these summer host plants they may produce an alate brood, which fly to other herbaceous plants and so they continue till the autumn when "return migrant" alatae arise and fly back to the Prunes.

On the Prunes they give rise to oviparous females and later alate males fly back and join them. In late October and November egg laying takes place. This serious Plum pest has been

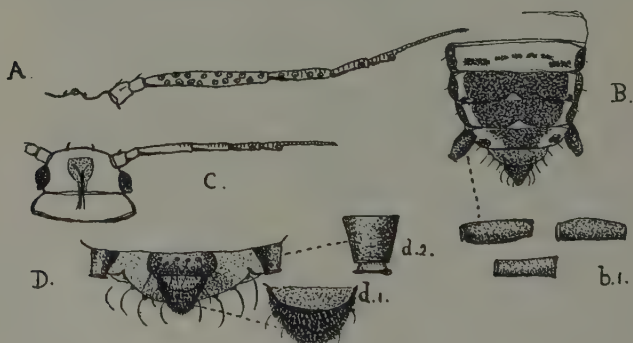


Fig. 113.—*Anuraphis helichrysi* var. *warei* Theobald.

A. Head and antenna. B. Abdomen, and b.1 Cornicles of Alate ♀; C. Head and antenna. D. Apex of body, d.1 Cauda, d.2 Cornicle of Apterous ♀.



called in most early economic writings *Aphis pruni* Reaumur (Ormerod, Whitehead, Theobald, etc.). Later it has been known as *Aphis prunina* Walker. Several other of Walker's Aphides described from *Prunus* are evidently the same. Koch's *myosotidis* certainly is and so are the ones I have described as *warei*, *cinerariæ*, *glaucifolii* and *abrotaniella*.

For a long time I considered Kaltenbach's *helichrysi* as distinct from *prunina* on account of the following antennal characters :

1. Alate female *helichrysi* :

On *Helichrysum*, Ant. Seg. iii., 13 to 21 ; iv., 1 to 4.

On *Matricaria*, Ant. Seg. iii., 13 to 17 ; iv., 1 to 3.

2. Alate female *prunina* :

On *Prunus*, Seg. iii., 29 to 35 ; iv., 13 to 15.

On *Myosotis*, Seg. iii., 36 to 42 ; iv., 13 to 15.

On *Umbelliferae*, Seg. iii., 24 to 28 ; iv., 13 to 15.

A detailed examination of a long series from other plants of very similar insects shows that these characters will not hold good. The following table gives some of these variations.

1. *helichrysi* (on typical host), iii., 13 to 21 ; iv., 1 to 4.
2. *warei* (on Clover), iii., 16 18 ; to iv., 2 to 5.
3. *cinerariæ* (on Cinerarea), iii., 19 to 22 ; iv., 4 to 6.
4. *apposita*, iii., 22 to 26 ; iv., 1 to 4.
5. *prunina* (on Prunes), iii., 29 to 35 ; iv., 13 to 15.
6. *glaucifolii* (on Glaucium), iii., 35 to 40 ; iv., 6 to 9.
7. *abrotaniella* (on Artemisia), iii., 35 to 40 ; iv., 1 to 4.
8. *myosotidis* (on Myosotis), iii., 36 to 42 ; iv., 13 to 15.

The form on Clovers most nearly approaches the type species. I now feel sure it is the same. This small Aphid occurred in vast numbers in August, 1923, in and around a field of seeds, much of which was Wild Red Clover (*Trifolium pratense*) : it also occurred on Wild White (*T. repens*) ; Alsike (*T. hybridum*) ; Rough Clover (*T. scabrum*) and cultivated Red Clover around Wye, at Sandwich and Folkestone and Laing found it at Stanmore, in Middlesex, in 1915.

At Wye it continued on Clover until November and even into December, where a few heads of blossom still persisted. So bad

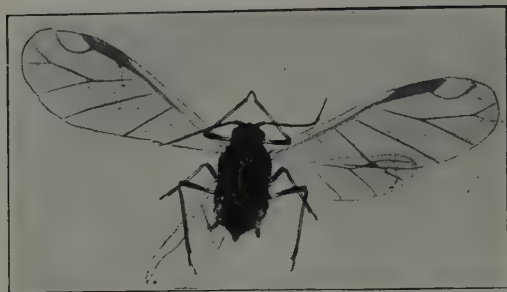


Fig. 114.—Alate viviparous female of *Anuraphis helichrysi* var. *warei* Theobald.

was the attack that scarcely a seed head of the Wild Red Clover had developed on account of the constant sucking of these minute plant lice and the crop was a total loss. The aphides swarmed in the heads, not only between the florets, but right down the tubes



Fig. 115.—Apterous female of *Anuraphis helichrysi* var. *warei* Theobald.

and the heads of blossom assumed a ripe and shrivelled brown appearance. Great numbers of the insects died when the clover was cut and many others had succumbed previously when the blossoms died. They occurred in smaller numbers in the Wild White Clover, but there also did some considerable harm. The clover nearest the hedges was first attacked, but by mid-August the whole field was ruined. A field close by with cultivated Red Clover was scarcely hurt although numbers of the Aphides occurred



Fig. 116.—Wild Red Clover Heads killed by *Anuraphis helichrysi* var. *warei*.

A. Secondary flower head, not attacked.

in the larger blossoms. The first alatae hatched out on August 19th and became more abundant until the 29th, when they decreased, but alatae could always be found in some numbers up to mid-November. Various trials were made to infect other plants but all failed, and as no sexuales appeared and it persisted into the winter I thought it must be a distinct species. It is certainly a distinct biological form of *helichrysi*.

The typical *helichrysi* I found at Wye on *Helichrysum*. In certain years numbers that occurred on *Matricaria* had most erratic wing venation; in 1911 and on to 1915 the wing venation was partly Toxopterid, partly Aphid; then for the next three years they were normal.

The specimens I identified as *apposita* Walker from Windermere (20 vi. 15) and Wye (20 vii.-xi. 15) feeding in the flower heads of Groundsel are certainly this insect. Alatae appeared

now and again in June, August and in September in great numbers and the apteræ persisted into November and then died.

On Cinerarias the leaves are curled much as on the Plum, on the other plants they live mainly on the flower heads.

Walker's description of *Aphis prunina* (Zool., VI., 2250 (1848) : "*Wingless viviparous female*. The body is grass green, elliptical and slightly convex ; the antennæ are dull yellow and scarcely more than  $\frac{1}{2}$  length of body ; eyes are dark brown ; the rostrum is dull yellow, with a brown tip ; the tubes are about  $\frac{1}{12}$  the length of the body ; the legs are pale yellow ; the tarsi and tips of the tibiæ are brown. At end of April." Walkers' later description is as follows :—(Ann. Mag. Nat. Hist., 1849) :—" *Apterous viviparous female*. Body nearly elliptical, convex, thick, highly arched, grass-green, smooth, shining ; feelers setaceous, pale yellow, darker towards their tips and about  $\frac{1}{3}$  length of body ; fourth joint much shorter than the third, but more than half its length ; fifth shorter than fourth ; sixth a little shorter than fifth ; seventh nearly as long as third ; eyes dark-brown ; mouth pale green, with brown tip ; nectaries pale yellow, less than  $\frac{1}{12}$  the length of the body ; legs pale yellow, feet and tips of shanks brown. Middle of May. 1st variety. A dark green stripe on the back, feelers pale green, brown towards tips, nearly  $\frac{1}{4}$  length of body ; nectaries pale green, with brown tips about  $\frac{1}{20}$ th length of body ; legs pale green, with brown feet. 2nd var. Body pale greenish-yellow, mottled with green and having a green stripe on the back ; feelers greenish-white with brown tips and less than  $\frac{1}{3}$  length of body ; eyes dark red ; mouth and legs greenish-white, former with brown tip ; feet black ; nectaries very pale, with brown tips and nearly  $\frac{1}{6}$  length of body. 3rd var. Body small, oval, convex, plump, dull green ; front slightly convex and has no tubercles ; feelers rather less than  $\frac{1}{2}$  length of body ; 1st and 2nd joints not angular ; 4th much shorter than 3rd ; 5th shorter than 4th ; 6th shorter than 5th ; 7th very slender and longer than 4th ; nectaries are not more than  $\frac{1}{20}$ th length of body ; legs rather short. *Alate viviparous female*. Second vein diverges slightly from first, but nearly parallel to 3rd, forks of latter variable in situation ; 2nd fork usually rather long ; 4th much curved in early part of its course and angle of bend whence it springs very slight. Length  $\frac{1}{2}$  to  $\frac{2}{5}$  line. On Sloe in May."

Walker's other species described from *Prunus domestica*, etc., which may be all the same as *helichrysi* are as follows :—

*Aphis convecta* (Zool., VII., xxxvii., 1849). “Wingless viviparous female. The body is oval, slightly convex, grass-green; the antennæ are dull yellow and hardly more than half the length of the body; the eyes are dark brown; the rostrum is dull yellow with a brown tip; the tubes are about  $\frac{1}{2}$  of the length of the body; the legs are pale yellow; the feet and the tips of the shanks are brown. Found in May on *Prunus domesticus*.”

*Aphis persorbens* (Zool., VII., xxxvii., 1849). “The body is oval, convex, shining, grass green or dull pale green, sometimes prettily mottled with red or crimson and like a ripe plum in colour; the antennæ are pale green, darker towards the tips and less than half the length of the body; the eyes are dark brown; the rostrum is pale green, with a brown tip; the tubes are more than  $\frac{1}{20}$ th the length of the body; the legs are pale green; the tarsi, the tips of the tibiæ are brown; the limbs are white for a while after the skin has been shed. Found before the middle of April.”

*Aphis detracta* Walker (Zool., VII., xxxviii., 1849). “Winged viviparous female. The body is black, small and shining; the antennæ are shorter than the body; rostrum dull green, with a black tip; abdomen dark green, with a row of black spots on each side; disc black and sometimes the spots are confluent and occupy the whole back; tubes black,  $\frac{1}{8}$  the length of the body; legs dull yellow, thighs except base, tarsi, tips of tibia black; wings colourless, very much longer than body; the squamulæ pale green; stigma pale brown; veins brown; the legs are sometimes quite black, with the exception of the fore thighs, which are dull pale yellow at base. Whilst a pupa it is nearly elliptical, grass green and sometimes varied with red; antennæ dull yellow and hardly more than  $\frac{1}{2}$  length of body; the eyes are dark brown; the rostrum is dull yellow, with a brown tip; the tubes are about  $\frac{1}{12}$  length of body; the legs are pale yellow; the tarsi and the tips of the tibiæ are brown. Found in May.”

Buckton's *Aphis petasitidis* seems to me to be only *helichrysi*. and is so listed in the British Museum collection, where Buckton's slides are to be found. It is described as follows :—

*Apterous viviparous female.* “Bright green, almost transparent. Nectaries very small. Cauda none. *Pupa* wholly green. Head broad, usually tinged with ferrugineous red. Abdomen mottled with yellow and green. Antennæ about  $\frac{1}{2}$  length of body. Cornicles very small. Tips of antennæ, nectaries, tarsi and rostrum black. Eyes red.

“*Winged female.* Bluish-green. Head broad, front flat. Antennæ black ; 3rd joint thick and serrated on their lower edges. Head, thorax and nectaries, points of femora, tibiæ and tarsi black. Abdomen shining green, with a large squared dorsal patch and 3 other lateral spots, black. Legs slightly pilose. Rostrum reaches to 2nd coxæ. Tail very small, green and hairy. Wings finely punctured, insertions yellow ; stigma greyish ; veins black and strongly marked. On issuing from the pupa the winged females are wholly green, with the exception of the eyes and stemmata which are pale brown. Some mature specimens become entirely black, through the encroachment of the dark markings on the green. Size of body  $1.39 \times 0.62$  mm.” The species was taken plentifully by Buckton in early June on *Tussilago petasites*, at Albury, Herts, and afterwards it was sent him in July from Berwick by Mr. Hardy who took it at Holy Island, Northumberland, feeding on the Hounds Tongue (*Cynoglossum officinale*). Buckton says, this insect is characterised by a remarkably strong and black wing venation. It seems to me to be the common Leaf Curling Plum Aphid, in any case the specimens I have found on this plant which I had named *petasitidis* are.

Variety CENTAURIELLA Theobald.

Ent. Mo. Mag., LIV., 230 (1921).

*Alate viviparous female.* Head and thorax dark, body pinkish-brown, pinkish-ochreous or pinkish-green, with black transverse marks forming a black blotch on the posterior two-thirds of abdomen, a row of black spots each side. Cornicles brown ;



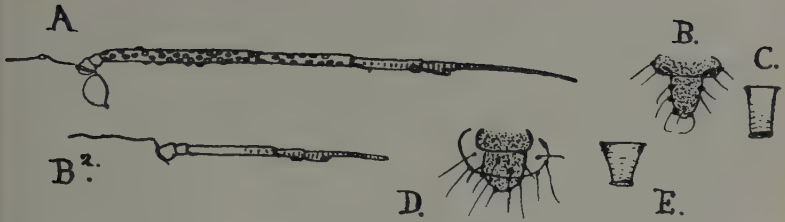


Fig. 117.—*Anuraphis helichrysi* var. *centauriella* Theobald.

A. Antenna of alate ♀; B. Cauda; C. Cornicle. B². Antenna of apterous ♀; D. Cauda; E. Cornicle.

iii. with 55-60 over whole length; iv. longer than v. with 10 to 12. Cauda and cornicles deep brown.

Length 1.5 to 1.7 mm.

*Apterous viviparous female.* Dingy pale green, tinged in parts with pale pink. Cornicles and cauda brown.

Length 1.2 mm.

*Nymph.* Pale clear green. Head, wing-buds and legs brown. Cornicles same colour on body, apices pale brown. Antennæ of 6 segments.

*Male.* Alate. Head and thorax dark, abdomen same colours as alate female and with similar adornment. Cornicles and cauda



Fig. 118.—*Anuraphis helichrysi* var. *centauriella* Theobald.

A: Male head and antenna; B. Sexual appendages; C. Cornicles.

dark; segment iii. of antennæ with 52 to 60 sensoria; iv. 20 to 26; v. 6 to 9 +1. Claspers dark. Penis pale brown, rather short and thick.

Length 1.2 to 1.3 mm.

FOOD PLANT. *Centaurea nigra*.

LOCALITY. Invershin, N.B. 7 ix. 20 (D. J. Jackson).

*Observations.* Colour notes made by Miss D. J. Jackson from living specimens. Found amongst colonies of *Macrosiphum jaceæ*, clustered near the flower heads. Structurally it approaches so closely to *helichrysi* that I have retained it only as a colour variety.

The American species *Anuraphis bakeri* Cowen and *A. cratægifoliæ* Fitch are closely related but the cornicles in both are markedly imbricate, whilst in *A. helichrysi* no imbrications show. The two American species are separated by the relative length of the rostrum, in *cratægifoliæ* it reaches or passes the third coxæ, in *bakeri* it is much shorter. (Vide Gillette and Bragg, *Journal Eco. Ent.*, 11, 333 (1918) and Baker, *Pro. Biol. Soc. Wash.*, 22, 185 (1919).

ANURAPHIS ULMARÆ Schrank.

Fauna Boica, II., 116, 1221 (1801).

*Apterous viviparous female.* Green, front of head, cauda and anal plate and apex of body darkened. Antennæ green, base and apices darkened. Legs green, darker than body; tarsi dark. Cornicles dark green. Eyes reddish-black. Some specimens have darker mottlings and lines on body. Antennæ short, less than half length of body; segment i. a little longer than ii.; iii. nearly twice as long as iv. and about as long as vi.; iv. a little longer than v.; v. a little longer than basal area of vi.; vi. short; basal area a little less than half the flagellum. Rostrum narrow reaching to second coxæ. Cornicles short, thick, broadened basally, about as long as antennal segment v. Cauda small, about as long as cornicles and wider, conical, with 4 very fine hairs. Anal plate flat at apex, sides slightly contracting to base, with several hairs. Apical segment of body rounded, with 4 long hairs on the posterior border. Legs rather short and thick; coxæ darkened. A few hairs on head and numerous short pale ones on tibiæ.

*Length* 1.5 to 1.9 mm.

*Alate viviparous female.* Green ; head, pronotum and thoracic lobes deep brown ; cornicles, cauda and anal plate deep brown ; antennæ with segments i.-iii. deep brown, apex of v. and all vi., remainder green ; legs green, coxæ, trochanters, most of femora, apices of tibiæ and the tarsi dark ; dusky lateral abdominal spots, a dusky spot at base of cornicles and dusky patch at apex ; a dark ventral thoracic plate ; eyes large, dark. Antennæ shorter than body ; segment i. wider but no longer than ii. ; iii. longer than iv., about as long as the flagellum, with 5-7 unequal sized round sensoria ; iv. a little longer than v. ; v. with normal primary sensorium ; base of vi. a little more than half of v. ; iii.-vi. markedly imbricate. Rostrum reaches nearly to second coxæ. Abdomen with six pairs of lateral papillæ, the first and last large, cornicles cylindrical, swelling basally, imbricate, about length of antennal segment iv. ; cauda more than half cornicles ; with several markedly curved hairs ; anal plate rather large, hairy. Legs with short, stiff, dark hairs. First fork-cell of wings *very small*.

*Length* 1.7-2 mm.

FOOD PLANTS. *Spiræa ulmaria* and *S. salicifolia*.

LOCALITY. Wicken Fen, x. 26 (J. Davidson) ; Tregarth, near Bangor, 20 vi. 21 (Walton).

*Observations.* Schrank's *Aphis ulmaricæ* has always been taken to be a *Macrosiphum*. Mordwilko first pointed out this mistake. Schrank's original description which is appended shows that his *ulmaricæ* is not a *Macrosiphum*. The insect described here is clearly Schrank's species and the short cauda and cornicles place it in the genus *Anuraphis*.

Schrank's description is as follows :—" Glatt, sattgrün mit tiefgrünen Zeichnungen. Der Körper durchaus sattgrün mit tiefgrünen gestrichten Zeichnungen, und völlig glatt. Die Fühlhörner kürzer als der halbe Leib, schwärzlich, am Grunde, nebst dem kürzer Saugstachel weisslicht ; die Füße dunkel ; am Grunde heller. Die Saftspitzen länger als das sehr kurze Schwänzchen am After."

## ANURAPHIS LAPPÆ Koch.

*Aphis lappæ* Koch.

Koch, Die Pflanz., 50, 1, fig. 63, pl. IX. (1854) ; Schouteden, Mem. Soc. Ent. Belg., XII., 222, 32 (1906) ; Graeth, Mem. Ac. Cienc. Madr. (1887).

*Apterous viviparous female.* Head and body dark olive-grey ; brighter below than above ; pale, almost yellowish at the sides to greenish-yellow ; middle of abdomen much darkened, paler apically, with dark transverse bars ; 2 spots on pronotum. Antennæ very short, a little more than quarter length of body ; base pale, apical half dark. Rostrum yellow, apex dark. Cornicles rather short and dark. Legs pale, apices of femora and tibiæ of hind legs and to some extent those of the fore and mid dusky. Elongate oval.

*Length* 1 mm.

*Alate viviparous female.* Head and thorax dark. Abdomen green, with a large dark central patch and very large dark lateral spots ; dark around base of cornicles. Antennæ, legs, cauda, and cornicles dark. Antennæ shorter than body ; segment i. larger than ii. ; iii. longer than iv. + v., with 30 to 35 large sensoria ; iv. much longer than v., with now and then 1 to 2 sensoria ; v. about twice as long as basal area of vi. ; flagellum about as long as iv. Head flat in front. Eyes very large, dark. Cornicles short, dark, broad, cylindrical, rather narrowed apically, about as long as base of vi. or slightly longer. Cauda dark, shorter and broader than cornicles, 3 hairs each side. Rostrum rather broad, reaching to second coxæ. Veins and stigma yellowish-brown.

*Length* 1.3 to 1.5 mm.

FOOD PLANTS. Burdock (*Arctium lappa*) ; Carrot (*Daucus carota*) (Schouteden).

LOCALITIES. Guildford (20 v. 13) ; Abingdon, 17 v. 15 (F.V.T.) ; Etterbeck, Belgium (Schouteden) ; Germany (Koch).

*Observations.* I found a few apteræ and one alate female of what is evidently Koch's *Aphis lappæ* at Guildford and two at Abingdon. It is a marked species, but seems to be rare in this country. Schouteden records it from the roots of *Daucus carota*

in Belgium. The coloration of the apteræ is marked, especially the yellow sides. Some specimens show dull reddish-brown marks as well on the body.

*ANURAPHIS PRUNIFEX* Theobald.

Ent. Mo. Mag., LXII., 163, fig. 2 (1926).

*Apterous viviparous female.* Black, deep blackish-green, or yellow-green with black transverse bars on abdomen and dark lateral spots, these vary so much that the whole insect becomes dark; very shiny. Antennæ less than half body, base pale, apices dark. Cornicles short, black. Anal plate and cauda small, hidden under abdomen, dark. Legs green, apices of the fore tibiæ and most of mid and hind tibiæ dark; tarsi dark. Segment i. of antennæ dark, larger than ii., which is pale; iii. nearly twice iv.; iv. a little longer than v.; iv. to vi. dark, base of vi. a little shorter than v.; flagellum about four times as long as base. Rostrum reaching to third coxæ; green, apex dark. Cornicles short, thick, bases expanded, about as long as last hind tarsal. Anal plate flat, broadly rounded at apex, many long hairs. Cauda small, round apically. Spiracles with a black area around them. A few short hairs on body. Legs moderately long and thick, a few hairs at apices of femora and many short ones on tibiæ. In some specimens the apex of antennal segment iii. is dark.

*Length* 1.5 to 2.0 mm.

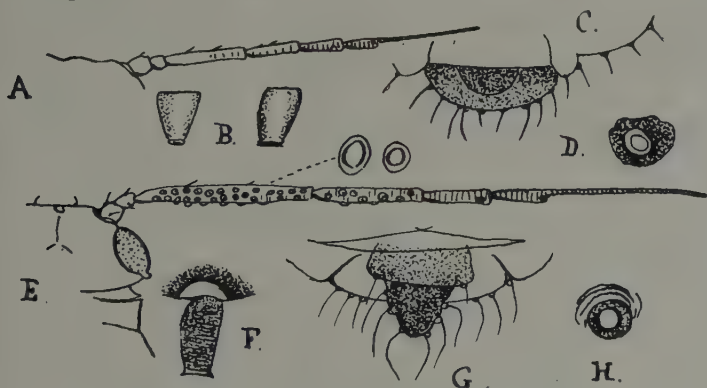


Fig. 119.—*Anuraphis prunifex* Theobald.

A. Head and antenna; B. Cornicles; C. Cauda and anal plate of apterous ♀; D. Spiracle and dark area; E. to H. the same of alate ♀.

*Alate viviparous female.* Head, thorax, cauda, cornicles and anal plate black. Abdomen deep brownish-green to almost black, very shiny, with darker lateral marks. Venter pale brownish-green, black towards apex. Legs pale greyish-brown; apices of femora, tibiæ and the tarsi black. Antennæ nearly as long as body; segment i. wider than ii., but no longer; iii. much longer than iv., but not so long as vi., with 28 to 32 sensoria; iv. with 9 to 12; v. shorter than iv.; basal area of vi. about two-thirds of v.; flagellum moderately long. Rostrum narrow, reaching to second coxæ. Cauda slightly projecting from abdomen, about as long as cornicles, nearly twice as wide at base; 3 hairs one side, 2 the other. The short, jet black, cylindric cornicles are constricted one side at the base, shorter than last hind tarsal. Wing insertions pale; stigma grey; veins grey to pale brownish-green. Base at cornicles pallid. A few hairs on body.

*Length* 1.5 mm.

FOOD PLANT. *Prunus spinosus*.

LOCALITIES. Romney Marsh, 19 vi. 14 (F.V.T.); Wimbledon Common (Laing).

*Observations.* I cannot trace this very marked insect to any described species, but it may be one of Walker's *Prunus* aphides. It occurred in great numbers on some isolated dwarf *Prunus spinosus* growing out on the shingle on Romney Marsh. It caused the leaves to curl tightly up and become pale in colour; some pale green, others yellow, others with a pink tinge. When I took them, they were apteræ, but the colony I brought away by car soon became nymphæ and the alatæ hatched out first on June 24th and went on until July 9th. The variation in colour of the apteræ was very marked, some being jet black, others with traces of linear deep green bands and a median line, others in which the black showed only as broad median transverse bars and dark lateral spots.

ANURAPHIS EXUL. Walker.

*Aphis exul.* Walker.

Zoologist, VII., p. 48 (1849).

*Alate viviparous female.* Black to deep blackish-green; abdomen dorsally dark green to almost black, the venter and edges



being paler green. Antennæ black to deep olive green. Cornicles, cauda and anal plate black. Legs ochreous, with black apices to femora and tibiæ and black tarsi. Antennæ considerably shorter than the body, rather thick. Segment i. wider and about same length as ii. ; iii. longer than iv. but not quite so long as vi., rather thick, with 27 to 30 rather densely packed sensoria ; iv. a little

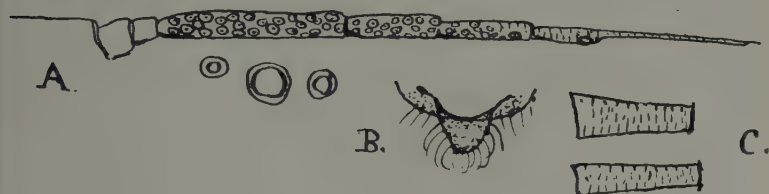


Fig. 120.—*Anuraphis exul*. Walker.

Alate ♀. A. Antenna ; B. Cauda and anal plate ; C. Cornicles.

longer than v., with 10 to 14 sensoria ; a large sub-apical one on v. and now and then 1 to 2 secondary ones ; vi. with basal area not quite half v. to a little longer ; flagellum not quite so long as iii. Rostrum dark, not quite reaching second coxæ to just beyond. Cornicles cylindrical, about as long as segment iv. of antennæ and very slightly thicker, a few rough reticulations at apices. Cauda broad, much shorter than cornicles, with a few hairs. Anal plate rounded, black, with a few pallid hairs. Balsam preparations show dark lateral spots and a dark irregular area at base of each cornicle, and also a dusky patch between them and the anal plate. A few scattered hairs over the body.

Length 2 mm.

FOOD PLANT. Elder (*Sambucus nigra*).

LOCALITY. Wye, 7 x. 13.

Observations. Found with *Aphis sambucaria* and at once told by the short cauda and thicker antennæ, which have more sensoria. The apical wing-fork is large.

ANURAPHIS TRAGOPOGONIS Kaltenbach.

*Aphis tragopogonis* Kaltenbach.

Mono. Pflanz., 124, 9 (1843) ; Schouteden, Mem. Soc. Ent. Belge, XII., 228 (1906).

*Apterous viviparous female.* Brown to very deep brown, slightly shiny and roughened on the surface in places. Cornicles rather short, deep brown. Legs deep yellow to deep yellowish-brown or all brown; apices of femora and tibiæ and the tarsi darker. Mid area of thorax and following 6 abdominal segments with deeper brown large median dorsal plates, divided in the median line and 4 large dark lateral spots, the last around base of cornicles. Antennæ shorter than body; segments i. and ii. deep brown; i. larger than ii.; iii. longer than iv., apex darkened; iv. not quite so long as v., brown, apex darkened; v. dark; vi. about as long to longer than iii., base about two-thirds of v.; deep brown, also the flagellum. Rostrum shiny yellow, base and apex dark, reaching to or just past second coxæ. Cornicles not quite, to as long as segment v., thicker, some slightly contracted towards base on one side, and at apex; imbricate. Cauda dark, shorter than cornicles, much broader, with 2 pairs of hairs each side and a few above. Anal plate dark, with a few hairs.

Length 1.6 to 1.8 mm.

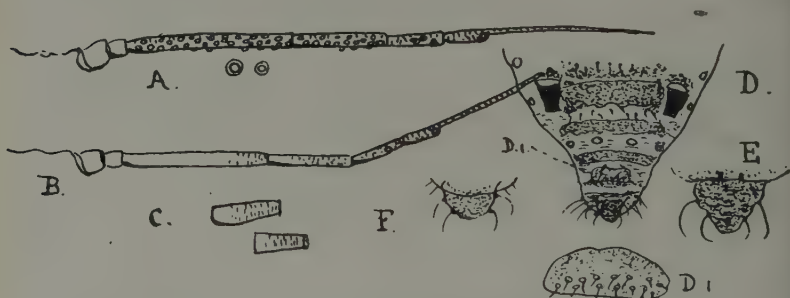


Fig. 121.—*Anuraphis tragopogonis* Kaltenbach.

A. Antenna of alate ♀; B. of apterous ♀; C. Cornicles; D. End of body; E. Cauda; F. Cauda of apterous ♀; D1. Posterior plate.

*Alate viviparous female.* Shiny; thorax blackish-brown; abdomen paler than thorax above, yellowish-brown to greyish-brown ventrally, with a dark median patch and 3 dark spots each side and dark broken irregular bars behind cornicles and one between them. Antennæ and cornicles black. Cauda deep brown. Anal plate deep brown to black. Legs blackish-brown; tibiæ, except apices, yellowish. Antennæ a little shorter than body to nearly its length; i. larger than ii., iii. longer than iv. with 32 to 38 sensoria over whole length; iv. longer than v. with

18 to 20 sensoria over whole length ; v. with 0 to 2 + 1 ; flagellum about as long as iii. Rostrum shiny black, base paler, reaching past second coxæ. Cornicles short and thick, expanded basally, imbricate. Cauda much broader than cornicles, 2 pairs of lateral hairs, often nearly as long as cornicles, but in some longer. Anal plate with rather long hairs. Legs moderately long ; femora of mid and hind pairs darkened ; tibiæ with a few hairs. Second cubital cell often as long as its stem ; veins thin, yellowish to yellowish-brown.

*Length* 1.6 to 1.9 mm.

FOOD PLANT. *Tragopogon pratensis*.

LOCALITIES. Wye, 18 viii. 11 and vi. 26 ; Herne Bay, 15 vii. 11 ; Pluckley, Kent, vi. 26 ; Fowey, 17 vii. 12 (F.V.T.) ; Germany (Kaltenbach) ; Belgium (Schouteden) ; Prussia (Laing).

*Observations.* I found this aphid in great numbers at Wye in 1911 and again in 1926 on the flower stalks, leaves and blossoms of the yellow Goat's Beard, quite blackening the plants. At Fowey I found a single colony only of apteræ and one colony of apteræ, nymphæ and alatæ at Herne Bay, Kent. It occurred at Pluckley in June, 1926, in numbers.

The dark brown colour will at once distinguish it on the food plant from *Aphis rumicis*. The alate females show in mounted specimens 2 rather large lateral abdominal processes. It is much attended by ants and I have found it being preyed upon by many larvæ of *Cecidomyiidae*.

ANURAPHIS LYCHNIDIS Linnæus.

*Aphis lychnidis* Linnæus.

*Myzus lychnidis* Schouteden.

*Aphis cucubali* Linnæus.

*Acaudus lychnidis* Van der Goot.

Linnæus, Syst. Nat., II., 734, 7 and Ed. 10, 451 (1758) ; Fabricius, Ent. Syst., IV., 210, 2 ; Syst. Ent., 737 (1775) ; Sp. Ins., 11, 384, 1 (1781) ; Mant. Ins., II., 315, 2 (1787) ; Syst. Rhyng., 294, 2 (1803) ; Schrank, Fn. Boica, II., 114, 1214 (1801) ; Kaltenbach, Mono. Pflanz., 92, 67 (1843) ; Walker, Ann. Nat. Hist., Se. 2, V., 280, 81 (1851) ; List. Homop. (B.M.), IV., 988, 89 (1852) ; Koch, Die Pflanz., 66, 13, figs. 86, 87 (1854) ; Passerini,

Aphid. Italicæ, 47 (1863); Buckton, Mono. Brit. Aphid., II., 73, pl. LIX. (1879); Schouteden, Mém. Soc. Ent. Belg., XII., 232, 6 (1906).

*Alate viviparous female.* Deep rich brown to almost black, more or less shiny, in some the abdomen of a rich brown hue. Antennæ and legs reddish-brown to brown, darkest apically. Cornicles brown, paler at bases. Cauda deep brown to deep green. Wing insertions yellow; veins yellowish-brown; stigma greyish-brown. Antennæ nearly as long as body, of 6 segments; segment i. wider than ii.; iii. longer than iv., with 20 to 30 sensoria of varied sizes; iv. longer than v., with 2 to 4 sensoria; vi. with basal area more than half of v and long, thin, flagellum; a few

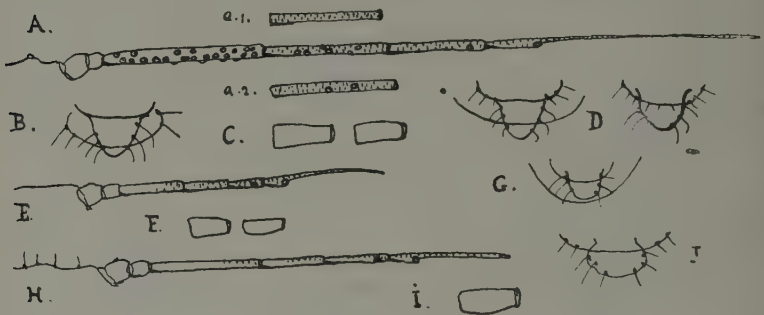


Fig. 122.—*Anuraphis lychnidis* Linnæus.

A. Antenna of alate ♀; a.1. and a.2. Antennal segment iv.; B. Cauda and anal plate; C. Cornicles; D. two forms of cauda of apterous ♀; E. Antenna of Stem Mother; F. Cornicles of Stem Mother; H. Head and antenna of apterous ♀; I. Cornicles; J. Cauda.

hairs on i. to v. Head with small median process. Eyes large, deep brown. Rostrum reaches third coxæ, hairy. Pronotum with small papilla each side. Some specimens show a large papilla each side of abdomen. Cauda small, obconical, projecting just beyond apex of body, rarely hidden, with a few hairs. Legs normal, apices of tibiæ and the tarsi dark, with a few hairs. Body with hairs rather long, arising from tubercles.

Length 1.5 to 1.8 mm.

*Apterous viviparous female.* Pitchy black to deep brown, shiny and usually covered with a glutinous substance. Base of antennæ and segment iii. reddish to yellowish-brown; tarsi dark

and now and then apices of tibiæ. Cornicles black, rather short. Cauda black, very slightly projecting beyond body. Anal plate black. Body hairy. Antennæ shorter than body; segment i. longer than ii.; iii. longer than iv.; iv. and v. about equal; vi. longest, basal area about half of v.; flagellum long. Head broad, with rather long, pale hairs. Rostrum reaches to third coxæ. A small papilla each side of pronotum and others on abdomen. Cornicles rather short and thick, cylindrical, in some slightly narrowed at base; a few apical striæ. Anal plate small, more or less rounded. Cauda rarely hidden under body, at other times projecting as in typical *Anuraphis*.

*Length* 1.5 to 1.7 mm.

*Stem Mother.* Deep shiny black, globular, hairy and with hard sculptured integument. Antennæ rather shorter than previous form; segment i. larger than ii.; iii. longer than iv. and about equal to iv. + v.; v. slightly shorter than iv. Cauda and anal plate rounded; former narrow and almost completely hidden under the abdomen. Legs shorter and more hairy than in previous form. Cornicles very similar.

*Length* 1.7 to 1.8 mm.

*Larvæ.* These vary from rich to deep olive green and some pale brown.

*Nymphæ* pale olive to pale brown, with greenish head, thorax and wing cases. Cornicles brown.

FOOD PLANTS. *Lychnis vescaria*; *L. diurna* and *L. vespertina*; *Silene inflata*.

LOCALITIES. Wye, v. and vi; King's Wood, Wye, 7. vii. 26 in *Silene* flowers; Brockenhurst, 12 viii. 15; Shaftesbury, 10 v. 13; Hastings and Hollington, 12 v. 11; Exford, 8 vi. 15; Seasalter, ix. 23; Croydon; Oxford, vi. 15 (F.V.T.); Windermere, 21 vi. 11 (Rymer Roberts); Great Salkeld, 13 v. 11 (Britten); Norwich; Croydon; Stanmore, Middlesex; Charmouth; Guernsey; Aberdeen; Birmingham (Laing); Walthamstow (Buckton); Scotland (Evans); Brussels and Blankenburg (Schouteden); Germany (Kaltenbach, Koch, etc.).

*Observations.* A very abundant species where it occurs, thickly clustering up the flower heads, stalks and leaves of the Red and White *Lychnis* from May to September. The Stem Mothers with their fat globular bodies and short antennæ occur early in May and soon become surrounded by the paler young. By mid May I have found alatae and they go on appearing throughout July, and I have found apteræ well into September but no sexuales. They may also be found in the blossoms of *Silene inflata* in July. When on the latter plant a single female only seems to occur in each blossom, where she produces a few pale young; in one blossom however I counted as many as twenty larvæ. The aphid secretions mix with the sticky exudate and often form a gummy mass on the plants. The cauda of the alatae projects beyond the body as a rule, but many remain partly hidden; in the apteræ it is usually more or less hidden under the body. I have sunk Van der Goot's genus *Acaudus*, as the cauda is present and just like typical *Anuraphis*. It is only the cauda of the Stem Mother that is completely covered over.

#### ANURAPHIS RUMICELLA Theobald.

Ent. Mo. Mag., LX. (3rd Se.), 125, (1924).

*Alate viviparous female.* Head and thorax dark; abdomen deep green, with a large dark patch, extending past cornicles; apex dusky and hairy; in some the abdomen is all dark. Femora dark, except at base; tibiæ dark at apices; tarsi dark. Antennæ as long as body; segment i. wider but no longer than ii.; iii. much longer than iv., not so long as vi., with 26 to 30 sensoria of unequal size; iv. about two-thirds of v.; base of vi. more than half of v.; flagellum long, about as long as iii. Cornicles thick, much shorter than antennal segment iv. Cauda bluntly triangulate with several hairs. Rostrum reaching past second coxæ.

*Length* 2.2 to 2.5 mm.

*Apterous viviparous female.* Deep blackish-green to black, with traces of white dusting. Very like *Aphis rumicis* in general appearance, but the body more elongated. Base of antennæ, cauda, anal plate and cornicles dark. Antennæ not half length of body; segment i. much wider but little longer than ii.; iii. rather less than twice length of iv. and nearly as long as vi.; iv. longer than v.; base of vi. about half of v. Rostrum reaching to or



nearly to third coxæ. Cornicles thick, cylindrical, somewhat narrowing apically; shorter and much thicker than antennal segment iii.; imbricated. Cauda very small, dark, blunt or slightly acuminate, constricted at base, not half length of cornicles;

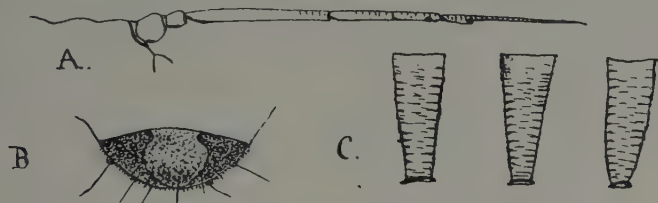


Fig. 123.—*Anuraphis rumicella* Theobald. Apterous ♀.

A. Head and antenna; B. Cauda and anal plate; C. Cornicles.

scarcely projecting beyond anal plate, which is broad, with a few hairs. Cornicles set far back, not projecting past cauda. Legs moderately long and thick, tibiæ with numerous hairs; a few scanty ones at apices of femora. No abdominal papillæ apparent.

Length 2.2 to 2.9 mm.

FOOD PLANTS. Docks (*Rumex spp.*); Jerusalem Artichoke (*Helianthus tuberosus*).

LOCALITIES. Wye, 17 iv. 20; Kew, 27 vi. 21 (F.V.T.); Ellerbeck, Crook, 27 v. 14 (Rymer Roberts); Portici, Italy, v. 23 (Silvestri).

Observations. Found in company with *Aphis rumicis*, which it closely resembles, but it is more elongate and the short, blunt cauda at once demarks it from that species.

#### ANURAPHIS VERBENÆ Macchiati.

*Aphis verbenæ* Macchiati.

Fauna e Flora d. Afidi d. Calabria. Bull. Soc. Ent. Ital., XV., 258 (1883).

*Apterous viviparous female.* Pale green to yellowish-green. Antennæ and legs yellow, apices dusky. Cornicles yellowish, in some dusky at apices. Eyes deep red. Oval in form, segmentation marked. Antennæ not quite half the length of body; segment i. a little longer than ii.; iii. as long as to a little longer than vi; iv. a little longer than v.; vi. with flagellum about

three times as long as base. Rostrum rather thin, apex dusky, reaching to second coxæ. Cauda and anal plate dusky, the former a little shorter than cornicles, both more or less hidden under last abdominal segment. Cornicles short and thick, broadened at bases. Legs rather long and thin, with a few very short hairs. Two short hairs on vertex and some longer ones on apex of abdomen.

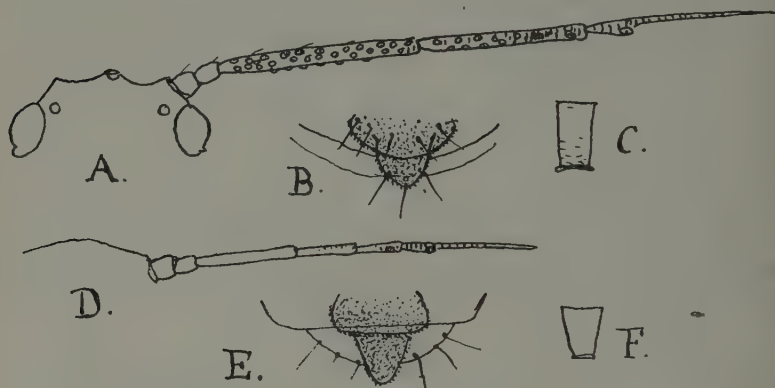


Fig. 124.—*Anuraphis verbenæ* Macchiati.

A. Head of alate ♀; B. Cauda and anal plate; C. Cornicle; D. Antenna of apterous ♀; E. Cauda and anal plate; F. Cornicle.

Length 1.3 to 1.7 mm.

*Alate viviparous female.* Head brown; thorax dark brown, lobes shiny black. Abdomen green to yellowish-green, with dark lateral spots. Antennæ, cornicles, cauda and anal plate dusky. Legs green, coxæ and trochanters dark, most of femora dark, apex of tibiæ and the tarsi dark. Antennal segment i. wider but no longer than ii.; ii. about as long as vi. with 28-32 sensoria; iv. a little longer than v., with 7 to 9 sensoria; v. a little longer than base of vi.; flagellum not quite four times as long as base. Rostrum reaches third coxæ. Eyes large, deep red. Cauda and anal plate spinose, with several long hairs, former about as long to a little shorter than cornicles, which are cylindrical, but in some slightly broadening basally. Wing insertions green, veins and stigma greyish-green.

Length 1.5 to 1.9 mm.

FOOD PLANT. *Verbena chamædryfolia* and *V. officinalis*, also cultivated *Verbena*.

LOCAL TIES. Wye, 17 vii. 18 (F.V.T.) ; Italy (Macchiati).

*Observations.* I have only found this small species once in 1918 when it swarmed on wild and cultivated *Verbena*, doing much harm to the latter. It swarmed not only under the leaves, which it curled up, but also on the flower heads. Beds of *Verbena* were that year destroyed by this plant louse. Macchiati only described the apterous female.

ANURAPHIS ACHILLEÆ Fabricius.

*Aphis achilleæ* Fabricius.

Fabricius, Ent. Syst., IV., 213, 15 (1776) ; Jackson, Scot. Nat. Sep. Oct., 1919, 161, fig. 111 (1919).

*Alate viviparous female.* Head brown to deep brown ; antennæ not so long as body, deep brown, in some paler at base of segment iii. Thorax deep ochreous brown, lobes black. Abdomen dull greenish yellow to brownish ochreous. Legs dull yellowish-green or ochreous, apices of femora and tibiæ and the tarsi dark. Cornicles short, cylindrical, rather thick, pale brownish-ochreous to pallid yellow. Cauda small, pale brownish-ochreous. Antennal segment i. a little longer than ii. ; iii. longer than iv., about as long as vi., with 15 to 22 sensoria ; iv. a little longer than v, with 4 to 5 sensoria ; v. a little longer than basal area of vi. ; basal area of vi. about one-third flagellum. Cauda about as long as cornicles but broader ; 3 hairs each side. Anal plate broadly rounded, with several hairs. Rostrum reaching second coxæ. Wing insertions yellowish and yellowish-grey stigma ; veins pale.

*Length* 1.3 to 1.5 mm.

*Apterous viviparous female.* Pale ochreous yellow, some suffused with pale green. Antennæ pale ochreous, apices dusky and a dusky band at apices of segments iv. and v. Legs pale ochreous to pale yellowish-green ; apices of tibiæ and the tarsi dusky. Cornicles very pale ochreous. Cauda and anal plate pale ochreous. Antennæ very short ; segment i. a little larger than ii. ; iii. a little longer than iv., shorter than vi. ; iv. and v.

about equal; base of vi. equal to v., flagellum about twice its length. Cornicles short and broad, widened at base. Cauda a little shorter to same length as cornicles, broad, with 3 hairs one side, 2 the other. Anal plate rounded, often covering the short broad cauda. Rostrum reaches the second coxæ.

Length 1.2 to 1.4 mm.

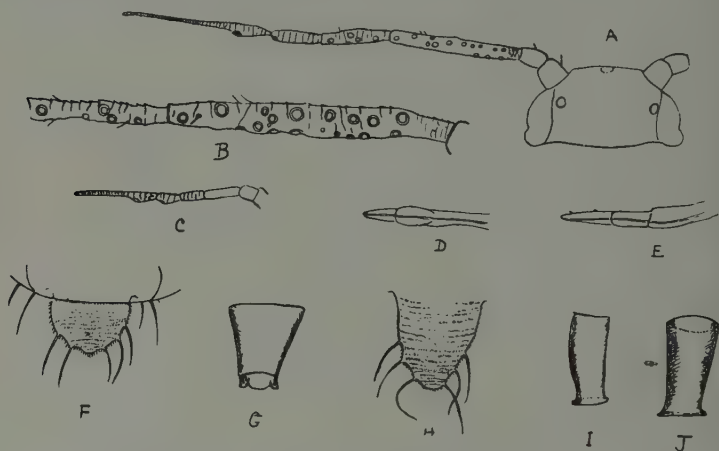


Fig. 125.—*Anuraphis achilleæ* Fabricius.

A. Head and antenna of alate ♀; B. Segments iii. and iv. more enlarged; C. Antenna of apterous ♀; D. Proboscis of apterous and E. of alate ♀; F. Cauda of apterous ♀; G. Cornicle; H. Cauda; I. and J. of alate ♀ Cornicles (Jackson).

FOOD PLANT. *Achillea millefolium*.

LOCALITIES. Bearsted, Kent, 12 viii. 17; Seasalter near Whitstable, x. 23 (F.V.T.); Beauly, Inverness-shire, N.B., 17 viii. 1918 (D. Jackson).

*Observations.* A small *Anuraphis* which is found on the flower stalks of the Yarrow or Milfoil, usually in company with *Macrosiphoniella millefolii*. Those found at Bearsted mainly occurred on the flower heads. This seems to me to be Fabricius' species although his word "albida" may make it appear doubtful, but I have found very pale legged forms. The original description is as follows:—"flavescens, abdomine viridi, antennis pedibusque albidis. Antennis filiformis, albidæ. Alæ albidæ. Anus stylus et cornicula albida."

## ANURAPHIS SHERARDIÆ Theobald.

Ent. Mo. Mag., LXII., 165, fig. 3 (1926).

*Apterous viviparous female.* Pallid green, some almost transparent; apex of antennæ, rostrum and the tarsi dark. Eyes reddish-black. Antennæ a little more than half length of body; segment i. wider but no longer than ii.; iii. longer than iv.; iv. a little longer than v.; base of vi. nearly as long as v., flagellum about twice as long as base. Rostrum reaching to or about third coxæ. Cornicles small, almost conical, about as long as segment v.



Fig. 126.—*Anuraphis sherardiæ* Theobald.

A. Antenna of alate ♀; B. of apterous ♀; C. Cauda and anal plate.

of antennæ, very broad at base. Cauda swollen, stumpy and a little shorter than cornicles, with some long hairs, finely spinose. Anal plate broader than cauda. Apex of abdomen with some long hairs. Legs rather short and moderately thick.

Length .8 to .9 mm.

*Alate viviparous female.* Green; head and thorax dark; antennæ, cornicles and cauda dusky; legs same colour as body; apices of tibiæ and the tarsi dark; rostrum dark at apex. Wings with only one fork-cell. Antennæ shorter than body; segment i. and ii. about equal; iii. much longer than iv., with 12 to 18 sensoria; iv. longer than v., with several sensoria; base of vi. not quite as long as v.; the flagellum three times as long as base. Cornicles short, not quite so long as segment v. of antennæ, wide, cylindrical, narrowed towards apex. Cauda about same length as cornicles.

Length 1 mm.

FOOD PLANT. Field Madder (*Sherardia arvens* L.).

LOCALITY. Prestatyn, North Wales, vii. 23 (A. A. Dallman).

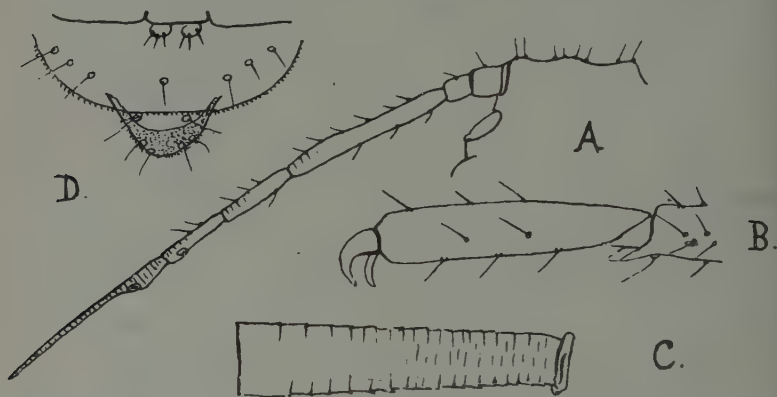
*Observations.* A very minute and delicate species, almost impossible to pick off the plant. Described from numerous apteræ and one or two nymphæ and a single damaged alate female.

## ANURAPHIS LEONTODONIELLA Theobald.

*Aphis leontodoniella* Theobald.

Entomo. Record, XXVII., 3, 54 (1915).

*Apterous viviparous female.* Very pale yellowish-green. Eyes large, deep black, edged with red. Head with a depression each side, raised in centre, with many pale hairs. Antennæ pallid, thin, about half length of body, of 6 segments; i. large and broad; ii. narrower and slightly shorter; iii. long, but not so long as vi.; iv. rather more than half of iii.; v. slightly shorter to nearly same

Fig. 127.—*Anuraphis leontodoniella* Theobald.

A. Head and antenna of apterous ♀; B. Hind tarsus; C. Cornicle; D. Cauda.

length as iv., longer than base of vi., which has a long, thin flagellum; all segments with long, pale hairs. A distinct large rounded papilla each side of pronotum; 5 smaller ones each side of abdomen, which has hairs. Cauda small. Anal plate rounded, with a few hairs. Cornicles very pale, moderately long, showing faint imbrication. Legs, including ungues very pale, hairy; apices of tibiae projecting on one side in a short, sharp process. Rostrum pallid, reaching beyond third coxæ.

*Length* 1.8 mm.

The *nymph* is very similar but the cornicles are slightly longer; the wing pads pallid and semi-transparent.

*LOCALITY.* Wye, 27 x. 1911 (F.V.T.).



*Observations.* Found in a nest of *Lasius flavus* and on Dandelion roots. I found many apteræ in both situations, but when I searched for them ten days later, none could be seen; as the nymphæ were appearing on the 27th very likely they had all become winged and flown. It is possibly the ground form of some other described species, but it has been named provisionally. The ants were watched "milking" the females whilst they were sucking the sap from the dandelion roots.

*ANURAPHIS SUBTERRANEA* Walker.

*Aphis subterranea* Walker.

*Aphis terricola* Rondani?

Walker, List. Homop. Brit. Mus., IV., 1033 (1852); Buckton, Mono. Brit. Aphid., II., 38, pl. XLVII., fig. 5 (1879); Rondani, Nuov. Ann. Sci. Nat. Rend. Sc. 2, VIII., 344 (1847).

*Male.* Alate. Head and thorax dark. Body green. Head rather broad. Eyes very large, black. Antennæ a little longer than body; segments i. to iii. dark; iv. paler; v. and vi. much

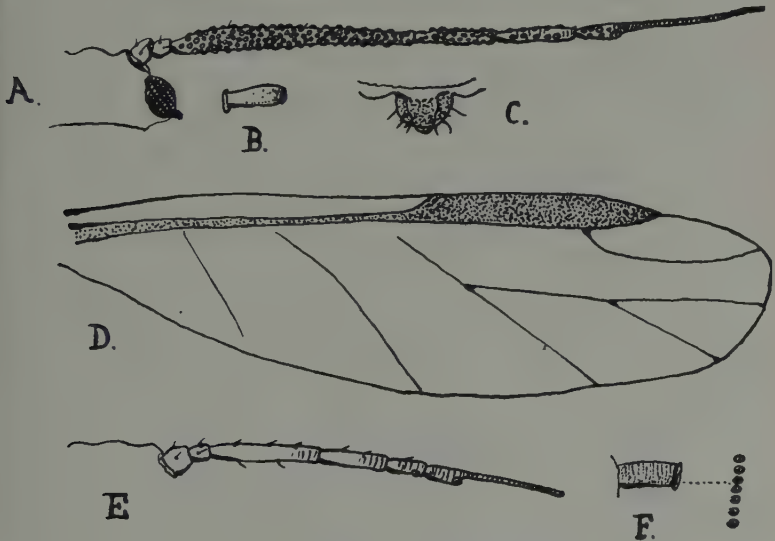


Fig. 128.—*Anuraphis subterranea* Walker.

A. Head and antenna of ♂; B. Cornicle; C. Cauda and anal plate; D. Fore wing; E. and F. Antenna and cornicle of nymph.

paler; i. wider than ii., with marked protuberance on one side; iii. long, longer than vi., with 160 to 180 sensoria; iv. with 40 to 50 sensoria; v. with 12 to 17; basal area of vi. with 5 to 6 sensoria and the usual group at apex, more than half length of v.; flagellum as long as base + iv. + v.; iii. markedly long and thick. Eyes black, very large. Cornicles short, dusky green, shorter than basal area of vi., somewhat constricted at base. Anal plate large, dusky green and orbicular, with a few hairs. Cauda green, short and thick, about as long as cornicles and thicker, with a few hairs, scarcely projecting beyond the anal plate. Rostrum as long as body, apical segment very long, longer than the elongate penultimate one, basal portion much narrowed. Legs green, long, apices of femora and tibiæ dark; tarsi dark. Wings very long, nearly three times as long as body; with markedly elongate stigma.

Length 1.2 to 1.5 mm.

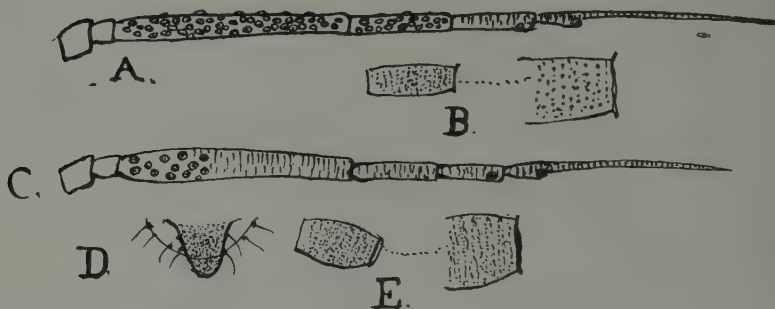


Fig. 129.—*Anuraphis subterranea* Walker.

A. Antenna of alate ♀; B. Cornicle; C. Antenna; D. Cauda; E. Cornicle of apterous ♀.

*Alate viviparous female.* Antennæ shorter than body; segment i. much wider than ii.; iii. long, longer than iv. + v. and nearly as long as vi., with many unequal sensoria (70 to 80) all over it, iv. about half of iii., with 17 to 30 sensoria; v. about two-thirds of iv.; base of vi. rather more than half of v., flagellum rather long, longer than iv. + v. Rostrum very long, reaching well past third coxæ. Cornicles rather short and thick, about as long as segment v. of antennæ, much thicker, with fine punctate ornamentation. Cauda small, bluntly triangulate. Anal plate

small, rounded. Legs moderately long; very fine, small hairs on tibiæ.

Length 3 mm.

*Apterous viviparous female.* Antennæ shorter than body; i. longer than ii.; iii. longer than iv. + v., nearly as long as vi., with a group of 17 to 22 sensoria on basal area and in some specimens from *Anagallis* with 9 to 10 at apex, and some on iv., basal area slightly swollen; iv. about one-third of iii.; v. shorter than iv.; vi. with basal area shorter than v.; flagellum about as long as iii. Rostrum very long, reaching some way past third coxæ. Cornicles rather short and thick, a little longer than iv., cylindrical, narrowing apically; ornamentation markedly punctate. Cauda small and triangulate, shorter than cornicles. Anal plate rounded. Legs rather short and thick. Eyes rather small.

Length 2.8 to 3 mm.

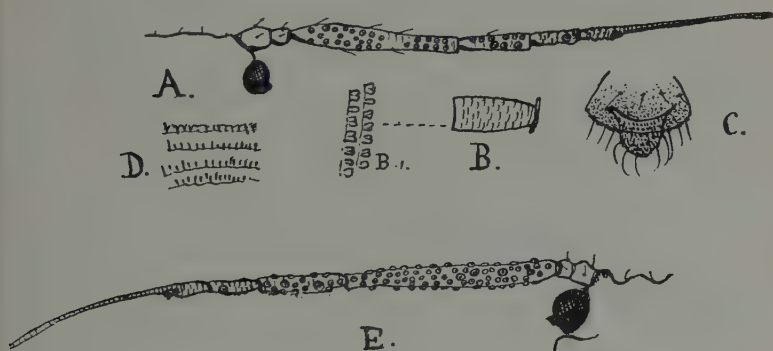


Fig. 130.—*Anuraphis subterranea* Walker.

A. Antenna of apterous ♀; B. Cornicle; C. Cauda and anal plate; D. Spines on cauda; E. Antenna of alate ♀.

From roots of *Anagallis*.

**FOOD PLANTS.** Parsnip (*Pastinaca sativa*); *Rumex* sp.; *Pimpinella saxifraga*; *Anagallis*. Buckton records it from the roots of *Dianthus plumarius*.

**LOCALITIES.** Southgate, viii. 47 (Walker); Long Ashton, Bristol, 7 vi. 14; Wye, viii. 27; Battle, 20 vi. 13; Berkhamsted, 13 ix. 13 (F.V.T.); Rothamsted, 13 ix. 16 (Rymer Roberts). Hendon, Oxshott, Midhurst, New Forest; all on parsnip (Laing).

*Observations.* This very marked ground Aphid is found feeding on the roots of the host plants, especially Parsnips. I have redescribed the alate female and the apterous form from Walker's specimens in the Dublin Museum; the male from a specimen in my own collection. This species has very marked cornicles in regards to ornamentation. The cauda and anal plate are often completely hidden under the body. The grouping of the sensoria on the basal area of the apterous female antennal segment iii. and the very tuberculate appearance of the male antennæ and the marked ornamentation of the cornicles at once demark this Aphid. The alatæ, nymphæ and apteræ sent me by Mr. Rymer Roberts from roots of Pimpernel were all attended by ants, which tore off the wings of the alate females: the ants were *Myrmica ruginodis*.

On one of Buckton's slides in the British Museum is an apterous specimen with sensoria along the whole of iii. and one or two about the middle of iv. Mr. Laing says it appears to be an oviparous female, but it has no sensoria on the hind tibiæ which are not swollen. Except for the sensoriation and the relatively longer rostrum it might be the same as the apterous viviparous female.\*

Walker's description of *A. subterranea*:—"Viridis vel rufa; antennis apice thoracis disco femoribus tibiisque apice tarsis que obscuris; alis limpidis.

Dull green or pale red, stout, convex, somewhat oval; front almost straight; feelers stout, hardly half the length of the body; fourth joint about half the length of third; fifth a little shorter than fourth; sixth shorter than fifth; seventh slender, almost as long as the fourth, fifth and sixth; nectaries about one-twentieth the length of the body; legs short.

*The viviparous winged female.* More slender than the wingless insect, almost elliptical; feelers more than half the length of the body; disc of chest dark; nectaries about  $\frac{1}{5}$  of the length of the body; legs moderately long; feet and tips of the thighs and of the shanks brownish; wings colourless; distance between the first and second veins more than twice farther at the tips than at the base; third a little nearer to the second at the base than at the tip, a little nearer to the second at the base than the

\* This may be the same as my specimen from *Anagallis* roots (fig. 126).

second is to the first ; first fork a little nearer to the second fork than to the third vein, a little nearer to the third vein than the third is to the second ; second fork as near to the fourth vein as to the first fork ; fourth curved near the base, almost straight towards the tip, very much nearer to the second fork than to the tip of the rib-vein. In July at the roots of the Parsnip, occasionally at the depth of one foot beneath the surface, where it crawls when the wings are about to be developed. Length of body 1 line ; of the wings  $2\frac{3}{4}$  lines."

It is possible that Rondani's *Aphis terricola* may be this insect, found on various roots.

#### ANURAPHIS FARFARÆ Koch.

##### *Aphis farfaræ* Koch.

Koch, Die Pflanzenlaus, 54, figs. 68, 69 (1854) ; Buckton, Mono. Brit. Aphid., II., 68 pl. LVII., figs. 3 and 4 (1877) ; Schouteden, Mem. Soc. Ent. Belge, XII., 220 and 225 (1906).

*Alate viviparous female.* Head, pronotum, and metanotum rusty red, with black markings ; the lobes shiny black. Antennæ shorter than body, black ; segments iii. and iv. thickly crowded with sensoria. The flagellum four times the length of the base of vi. Rostrum, yellow, apex dark. Abdomen yellowish-green, with 3 black lateral spots and black bands behind and traces of dark median paired areas on the first three segments. Cornicles rather short and black. Cauda rusty red. Legs yellow with dark apices to femora and tibiæ ; tarsi dark. Wings with shiny violet tinge ; stigma grey ; veins brown.

*Length* 2.5 mm.

*Apterous viviparous female.* Oval to rounded ; dull flesh colour, greenish at sides, with 5 pairs of black lateral spots, black bars caudad and dusky paired marks between and in front of cornicles and some small black glands on body. Antennæ dusky to brown. Legs yellowish, apices of femora and tibiæ dark ; tarsi dark. Cornicles, cauda and anal plate dark. Antennæ about half the body ; i. wider than ii. ; iii. twice iv., a little swollen at base with 7 to 10 small round sensoria in a small group ; iii. shorter than vi., not quite so long as the flagellum ; iv. a little longer than v. ; v. longer than base of vi., sensorium a

little way from apex. Head flat in front, no hairs visible. Rostrum reaching to third coxæ. Cornicles rather short, thick and slightly narrowing apically, lips flared; ornamented with fine pointed imbrication. Cauda broad and flattened, hidden under the rounded apex of body; anal plate, etc., with a few short hairs. Legs moderately long.

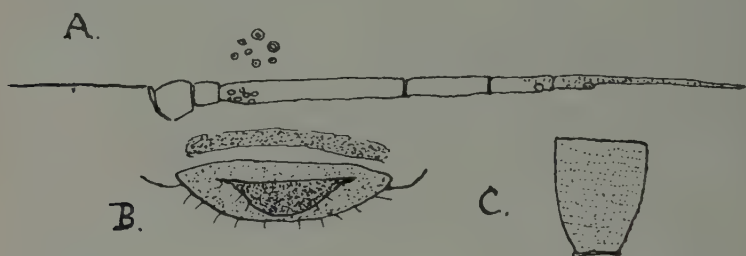


Fig. 131.—*Anuraphis farfarae* Koch.

Apterous ♀. A. Antenna; B. Cauda and anal plate; C. Cornicle.

Length 1.7 to 2 mm.

This is evidently the stem mother. Koch describes the rostrum as being long, reaching past the cornicles.

*Male.* Alate; head broad, deep rusty red to brown, dark in front; thorax deep rusty red with black lobes. Abdomen greenish to dull rusty green or almost green with three large black lateral spots and with black broken median bars, becoming thicker posteriorly and almost confluent at the apex; very variable in form. The antennæ about as long as body; dark but paler at base and apex; thick; basal segment wider but scarcely longer than ii.; iii. thick, especially at base, with 120 to 160 sensoria;

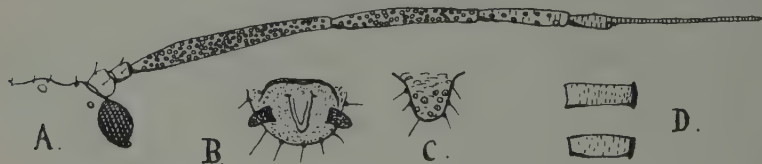


Fig. 132.—*Anuraphis farfarae* Koch. ♂

A. Head and antenna; B. Claspers and penis; C. Cauda; D. Cornicles.



longer than iv. ; iv. much longer than v. with many sensoria ; v. with 8 to 12 ; base of vi. half of v. ; flagellum thin and pale. Rostrum pale, apex dark, reaching much past third coxæ, mostly to cornicles and in a few past them. Cornicles black, imbricate, cylindrical, a little longer than base of antennal segment vi. Cauda and anal plate dusky ; latter with long hairs. Cauda with 3 hairs each side. Claspers dark and cone shaped. Wings much longer than body ; veins and stigma yellowish to dusky-brown.

*Length* 2 to 2.2 mm.

**FOOD PLANT.** Coltsfoot (*Tussilago farfaræ*).

**LOCALITIES.** Herne Bay, 7 ix. 10 ; Cambridge, 14 ix. 13 (F.V.T.) ; Haslemere (Buckton) ; Germany (Koch) ; Belgium (Schouteden).

*Observations.* This insect was described by Koch from the roots of Coltsfoot. Schouteden queries this species as being *persicæ* Boyer. Buckton describes the alate viviparous female taken on September 12th on Coltsfoot but not plentifully. He speaks of the head having the unusual number of five stemmata and also of the third antennal segment being distinctly ringed ; the fourth showing a tendency towards the same character. In spite of Buckton's statement, Mr. Laing finds the stemmata on the head of his specimen normal. Buckton's figure 4, pl. LVII., is evidently the alate male, the much longer cornicled insect No. 3 on the same plate is probably distinct. I have only seen the apteræ, alate males and nymphæ, the latter taken on the roots of Coltsfoot. It appears to be an uncommon species. In the two stages I have seen it is marked by the long proboscis, which reaches past the third coxæ to past the cornicles, but what I take to be the stem mother the rostrum only reaches the third coxæ. This species comes near *subterranea* but the males are very distinct and the rostrum is longer.

**ANURAPHIS TANACETINA** Walker.

*Aphis tanacetina* Walker.

Walker, Ann. Mag. Nat. Hist. Se. 2, VI., 46 (1850) ; Schouteden, Mem. Soc. Ent. Belge, XII., 228 (1906).

*Alate viviparous female.* Antennæ not so long as body ; segment i. larger than ii. ; iii. longer than iv., with 12 to 20 round

sensoria over it ; iv. a little longer than v. with 6 to 11 sensoria ; v. with 0 to 7 sensoria ; basal area of vi. a little shorter to nearly as long as v. ; flagellum less to nearly three times as long as base. Median ocellus on prominent projection in front of head. Cornicles moderately thin, cylindrical, about as long as segment v. of antennæ ; imbricated ; in some lights appearing spirally marked. Cauda small, triangulate, more than half the length of cornicles.

*Length* 1.5 to 1.8 mm.



Fig 133.—*Anuraphis tanacetina* Walker.  
Alate ♀. A. Head and antenna ; B. Cauda ; A.I. Cornicle.

*Apterous viviparous female.* Green. Antennæ less than half length of body ; segment i. much wider than ii. ; iii. slightly longer than iv. ; iv. slightly longer than v. ; basal area of vi. about as long as v. ; flagellum not twice as long as base. Proboscis reaches to or past second coxæ. Cornicles narrow and cylindrical, moderate, longer than antennal segment iii., imbricated, in some lights showing spiral ornamentation. Cauda rather small, bluntly triangulate, much shorter than cornicles.

*Length* 1.5 to 1.7 mm.

FOOD PLANT. Tansy (*Tanacetum vulgare*).

LOCALITIES. Southgate, 17 viii. 47 (Walker). Belgium (?) Schouteden.

*Observations.* I have never found this species and redescribe it from two slides of Walker's in the National Museum of Ireland. There are also slides of Walker's in the Hope Museum.

Buckton describes Walker's *tanacetina* (Mono. Brit. Aphid., II., 63) but I am not sure if the description applies to Walker's species as he says of the apterous female "cornicles very short," they are certainly not in Walker's specimens.

Buckton obtained his specimens swarming on the apical tufts of the Tansy and also on the stems of garden Chrysanthemums and Cinerarias at Norwich, Haslemere and Walthamstow. Schouteden queries his specimens from Belgium.

ANURAPHIS BELLIS Buckton. (?=*helichrysi*, Kalt.)

*Aphis bellis* Buckton.

Mono. Brit. Aphid., II., 98, pl. LXIX., bis figs. 1, 2, 4 (1877).

*Apterous viviparous female.* Pale green to almost lemon yellow; oval; somewhat flattened; head often brownish. Antennæ pale green, apices dusky. Legs green to yellow; tarsi dusky. Cornicles green to dusky-green. A few rows of hairs on body, longest behind. Antennæ much shorter than body, usually only slightly more than one-third of its length; i. broader but no longer than ii.; iii. longer than iv., but shorter than vi.; iv. a little longer than v.; basal area of vi. as long as or nearly so as v., the flagellum longer than iv. + v. Rostrum reaches past second coxæ; acuminate. Cornicles short and very thick, about as long as antennal segment iv., very little longer than cauda, expanding basally; obconical. Cauda short and stumpy, more or less rounded apically; 3 pairs of lateral hairs. Legs rather short and thick; a few hairs on apices of femora and more and longer on tibiæ. Seven pairs of very marked spiracles each side of body.

*Length* 1.5 to 1.9 mm.

*Alate viviparous female.* "Head and thorax black. Abdomen oval, ferruginous red, with 7 or more black dorsal bands and three lateral spots. Nectaries and tail very small and black. Legs reddish, with black femora and tarsi. Antennæ and eyes black. Wings very broad, with rounded tips. Insertions yellow, with smoky-grey cubitus and stigma. Veining black and somewhat coarse. Post-costal nervure of lower wing much curved. Length 1.890 × 0.076."

FOOD PLANTS. The Daisy (*Bellis perennis*); and Ox Eye Daisy (*Chrysanthemum leucanthum*).

LOCALITIES. Stowting, near Hythe, Kent, 7 vii. 14 (Duffield); Wye, 20 vi. 16 and 2 vii. 12 (F.V.T.); Aberdeen (Buckton).

*Observations.* This insect was described by Buckton from specimens sent him by Prof. James Trail who found them at Aberdeen "sparingly on the capitula in the axils of the ray florets of the Daisy." The specimens from Stowting were found in the florets of the Ox Eye Daisy. The very small Aphides which I found at Wye in July, 1912, on Ox Eye Daisies and again in my

garden in 1916 in the flowers of some cultivated daisies, occurred in such numbers that the flowers were much distorted. Similar apteræ I found on *Bellis perennis* on the lawn. I have never bred alatæ so append Buckton's description; he says "it has some resemblance to *Aphis amygdali*." The only other Aphid described from *Bellis* is Passerini's *Siphonophora malvæ*, which I have not found in Britain. The apteræ seem to me very near *helichrysi* Kalt. and only the darker head separates them, but the alate female is very distinct, judging from Buckton's description.

Buckton's slide in the British Museum contains one pupa, two apteræ and two alatæ. In spite of the colour Mr. Laing tells me he is inclined to treat it as *helichrysi*.

#### ANURAPHIS LENTIGINIS Buckton.

##### *Aphis lentiginis* Buckton.

Mono. Brit. Aphid, II., 59, pl. LV., figs. 1 and 2 (1877).

Not having found this species I append Buckton's description. It appears to belong to this genus.

"*Apterous viviparous female*. Size of body  $2.02 \times 1.54$ . Globose, dull black to the naked eye, but deep brown under a lens; somewhat fuscous in the neighbourhood of the head and tail. Eyes and antennæ black. Cornicles black as to three parts of their length and arising from two conspicuous orange yellow spots, situated at the base of the dorsum. Legs black, except as to the upper halves of the tibial joints, which are yellow. Tail very obtuse and inconspicuous.

*Winged viviparous female*. Size of body  $1.64 \times 0.88$ . Expanse of wings 7.35 mm. Head, eyes, antennæ and entire thorax dull black. Abdomen green, with 3 dark spots on each side. Legs pale ochreous, with black femora and tibial joints. Cornicles dark green. Cauda small and green. Rostrum short, reaching to second coxæ. Under side of belly green. Wings long. Veins somewhat liable to variation. Insertion, cubital and other veins pale brown. Stigmata rather darker brown."

The above description by Buckton was from specimens taken on Pear in early June at Cowfold, Sussex. Buckton says (p. 60), "On account of the rusty blotches on the dorsum, I give to my insect the trivial name *lentiginus*." He does not, however, mention

rusty spots in his description. From his figures it seems to be a very marked insect, which has not been observed since Buckton's time. There is no slide of this in Buckton's collection.

ANURAPHIS OPIMA Buckton.

*Aphis opima* Buckton.

Mono. Brit. Aph., II., 101, pl. LXXI. (1877).

*Alate viviparous female.* "Robust. Bright yellow. Eyes reddish. Thorax, band on prothorax, a double row of lateral spots and two or more large dorsal bands, shining black. Antennæ, nectaries, femora and tarsi also black. Underside wholly green. Insertions of wings yellow. Stigmata and veins greyish-black. Cauda small and pilose. Size of body  $1.52 \times 0.76$  mm.; expanse of wings 5.58 mm. Length of antennæ 1.64; of cornicles 0.20.

*Apterous viviparous female.* Rather large. Globose; glaucous green, blotched and stained with darker green, transparent. Head broad; eyes reddish-brown. Thorax and prothorax nearly confluent. Abdomen domed. Antennæ and legs pale green. Cornicles straight and brown. Tail very obtuse and inconspicuous. After a few moults a quantity of brown pigment is deposited in spots on the back and sides. This brown colour extends to the bases of the antennæ, the coxæ and tarsi. It encroaches more and more on the green, until the insect by age finally becomes almost wholly brown or shiny black. The legs and the middle antennal segments alone are left, and are of a fine amber yellow. Venter green, with black anal and vaginal plates. Rostrum tipped with brown and reaches to second coxæ. A row of pores, distinct from the stigmata, occur down each side of the back, when the insect is irritated by a bristle or otherwise, bright dark coloured drops exude from these as well as from the nectaries. These drops speedily crystallise into a sugar like mass. The young are very active and rove up and down the stem and leaves. Their semi-chitinous covering is marked by sutures, which cut up the back into apparent plates like the carapace of a crustacean. These young forms recall to mind the very curious dimorph of the Aphis of the Maple, *Chaitophorus aceris*, which will be afterwards described. This insect becomes bloated and distended from the quantity of sap it draws from the axils and leaf stalks of the *Cineraria*, to which plant it does great injury. It appears

to poison the plants it attacks, for the leaves droop and rot off in a manner far more marked than could be occasioned by the mere amount of sap abstracted. The winged form does not appear so plentifully as the apterous and seems to occur late in the year. The only specimens I have taken were from greenhouses from the end of October to November. The larvæ are common at Haslemere, Chichester and Wanstead from the month of April." There are five slides of what is apparently this insect of Buckton's in the British Museum, none are labelled *opima* in his writing, but two are labelled *cinerariæ mihi*, in his writing. One slide (B. G. cinerariæ Walk., No. 2) contains apterous *M. persicæ*. Another slide (B.G. *A. cinerariæ*, June 3rd) contains *Myzus persicæ* and *A. cardui*. The other three slides are also of *A. cardui*. His fig. I., pl. LXXI., is of *persicæ*; 2 is *cardui* and 3 *persicæ*. *Opima* is therefore a composite species and equal to *persicæ* and *cardui* as suggested by Mr. Laing. The insect I recorded as *opima* on *Begonia* (S.E.A.Coll. Journal, No. 17, 171 (1908) is only *helichrysi*. Buckton's description fits *cardui* perfectly well.

#### ANURAPHIS INCULTA Walker.

Zoologist, VII., App. xliii. (1849).

"The wingless oviparous female:—The body is very small, short, elliptical, green, covered with a whitish powder; the head, the eyes and the antennæ are black and the latter are nearly one-half of the length of the body; the tubes are black and not more than one-twentieth of the length of the body; the tip of the abdomen is black and slightly tapering; the legs are black; the thighs, except their tips, are green; the hind tibiæ are broad. In October, near Fleetwood."

FOOD PLANT. Wild Celery (*Apium graveolens*).

Observations. I have failed to find any Aphid answering this description on Wild Celery. It might possibly be the sexual forms of Koch's *Aphis lappæ*.

#### ANURAPHIS VACILLANS Walker.

Zoologist, VII., App. xlvii. (1849).

"The wingless viviparous female. The body large, long, narrow, grass-green; the disk of the abdomen is pale yellowish-green; the antennæ are pale yellow, with brown tips and as long



as the body ; the eyes are dark brown ; the mouth is green, with brown tip ; the tubes are black and about one-twentieth of the length of the body ; the legs are long and pale yellow ; the tarsi and the tips of the tibiæ are brown.

*The winged viviparous female.* While a pupa all the joints of the antennæ have black tips ; when the wings are unfolded the insect is green ; the disk of the thorax is buff, streaked with brown above, black beneath ; the antennæ are black and as long as the body ; the abdomen has short black bands on its disc and a row of black spots on each side ; the legs are black ; the thighs are dull yellow ; the wings are colourless and very much longer than the body."

FOOD PLANTS. Coltsfoot (*Tussilago farfara*).

*Observations.* Apparently not found since Walker described it. On searching for the type in the British Museum in 1904 I failed to find it.

ANURAPHIS(?) INSTABILIS Buckton.

*Aphis instabilis* Buckton.

Mono. Brit. Aphid., II., 94, pl. LXVIII. figs. 1-5 (1877).

*Apterous viviparous female.* " Size of body  $1.27 \times 0.62$  mm. Exceedingly variable in colour, often pale ochreous-yellow, green or ferruginous red. Oblong. Head very broad. Eyes brown. Dorsum much furrowed. Cornicles very pale. Cauda small, pilose. Legs short, stout, ashy-grey. Two small tubercles occur on the antepenultimate ring. *Pupa.* Var. 1. Wholly pale yellow. Thorax deeply furrowed. Nectaries pale, with black tips. Cauda black, obtuse. Wing cases, black. Legs sooty grey. Abdomen slightly hoary, from a grey covering of white powder. Var. 2. Head and thorax ferruginous. Abdomen bright green. Legs pale yellow. Wing cases luteous.

*Alate viviparous female.* Size of body  $2.02 \times 0.76$  mm. Head, thorax and band on prothorax black. Eyes red. Abdomen domed. Cornicles and tail pale yellow or green. More mature specimens are ferruginous red. Head, thorax and the greater part of the abdomen black. Cornicles and tail black. Legs

reddish with black femoral and tibial joints. Wings large; cubitus, stigma and veins yellowish-green.

This *Aphis* when young changes its colour, chameleon-like, almost every few minutes, so much so as to render it difficult to copy with a brush. Great numbers were taken on the Fever Few, *Pyrethrum inodorum*, towards the end of July, during thundery weather. At that time the pupæ were fast splitting their skins and giving birth to bright green imagos. This insect also infests *Epilobium montanum* and *E. parviflorum*. Taken at Pembroke by Mr. Charles Barrett." There is no representative of this in Buckton's collection.

#### GROUP 2.

The following species occur in this group:—

*Anuraphis sorbi* Kaltenbach.

„ *roseus* Baker.

„ *heraclei* Koch.

„ *cratægi* Kaltenbach.

„ *ranunculi* Kaltenbach.

„ *aucupariæ* Buckton.

The cauda is *Anuraphis*-like in the spring forms, larger in some of the summer forms and the cornicles are moderately long. The apteræ have 1-3 pairs of sub-median dorsal papillæ on the apical area of the abdomen, less developed in the alatæ and they may or may not have marked abdominal lateral papillæ; often mealy. The alatæ have also a pair of sub-median tubercles on the head. The antennæ with many sensoria on iii. and iv. and sometimes v. They are rather large, heavy species which produce much leaf-curling and some are subterranean.

#### FOOD PLANTS.

*Cratægus oxyacantha*

*A. roseus.*

„ „

*A. cratægi.*

*Heracleum spondylium*

*A. heraclei.*

*Pyrus communis*

*A. roseus.*

„ „

*A. cratægi.*

„ *malus*

*A. roseus.*

„ „

*A. cratægi.*

„ *pyraster*

*A. cratægi.*

„ *torminalis*

*A. aucupariæ.*

<i>Plantago</i> sp.	<i>A. roseus</i> .
<i>Ranunculus</i> spp.	<i>A. ranunculi</i> .
<i>Rumex</i> spp.	<i>A. ranunculi</i> .
„ „	<i>A. roseus</i> .
<i>Sorbus aucuparia</i>	<i>A. sorbi</i> .
„ <i>aucuparia</i>	<i>A. aucupariæ</i> .
„ <i>domestica</i>	<i>A. roseus</i> .
„ <i>torminalis</i>	<i>A. roseus</i> .

*Alate viviparous females.* SYNOPSIS TABLE (GROUP 2).

1. Abdomen reddish-yellow to dull ochreous, brown central area and deeper brown lateral spots ; iii. with 52 to 60 ; iv. 27 to 30 ; v. 6 to 10 sensoria ; 2 pairs of sub-median dorsal papillæ in front of cauda. *sorbi*.
2. Abdomen dull red to reddish-yellow ; black lateral spots and a black area posteriorly ; 3 to 4 pairs of black lateral tubercles before cornicles ; iii. 47 to 66 ; iv. 22 to 35 ; v. 0 to 12 + 1 ; 2 pairs of sub-median papillæ. *roseus*.
3. Abdomen dull green, large dark central area and lateral spots ; iii. 38 to 48 ; iv. 10 to 16 ; v. 0 + 1 ; 1 pair sub-median papillæ ; large lateral papillæ. *ranunculi*.
4. Abdomen greyish-yellow, black lateral spots and black bars caudad, cleared specimens show small dark areas on abdomen smaller than in *roseus* ; dark lateral tubercles and 2 pairs of sub-median papillæ. *heraclei*.
5. Abdomen black, with snow white band at base ; iii. 49 to 70 ; iv. 16 to 30 ; v. 0 to 7 + 1 ; 1 pair sub-median papillæ. *cratægi*.

*Apterous viviparous females.*

1. Yellowish-brown to yellowish-green or dark ; cornicles pale ; 2 sub-median dorsal papillæ. *sorbi*.
2. Purplish-brown, slaty, dull reddish, blue, blue black or pink. Head and pronotum shiny black ; cornicles black ; 2 pairs of sub-median dorsal papillæ. *roseus*.
3. Green to dusky green ; cornicles deep brown ; 2 sub-median papillæ and large rounded lateral papillæ. *ranunculi*.
4. Dusky ochreous ; head and pronotum dark, a large dark patch between cornicles and some smaller dark spots on body ; 2 pairs sub-median papillæ. *heraclei*.

5. Black, deep blackish-green to deep grey-green, much white meal; 1 pair sub-median dorsal papillæ; antennæ 5 segments. *cratægi.*

*ANURAPHIS SORBI* Kaltenbach.

*Aphis sorbi* Kaltenbach.

Kaltenbach, Mono. Pflanz., 70, 51 (1843); Koch, Die Pflanz., 96, pl. XVIII., figs. 129, 130 (1857); Baker and Turner, Jour. Agr. Res., VII., 322-323, pl. 20 A (1916).

*Apterous viviparous female* (fundatrix). Pale yellowish-brown to yellowish-green. Globular; head and pronotum small. Antennæ half to a little more length of body; i. larger than ii.; iii. longest, not quite equal iv. + v.; iv. and v. about equal; base of vi. more than half of v.; same colour as body, except v. and vi., which are dark and apices of iii. and iv. Rostrum reaches second coxæ. A large dusky papilla each side of pronotum. Cornicles rather long, cylindrical, pale except at apices, some white, others pale yellow. Cauda and anal plate dusky, cauda with a few pale hairs. Anal plate rather flat at edge, sides straight. Two sub-median papillæ on penultimate and 2 on last abdominal segment, and 1 each side of latter. Seven blunt dark papillæ each side of body. Legs rather long and thick, same colour as body, except apices of tibiæ and the tarsi, which are dark brown. Body segmentation well marked. Rostrum reaches second coxæ.

*Length* 2 to 2.3 mm.

*Apterous viviparous female* (Summer form). Similar in general colour and form to the "fundatrix," but smaller; antennæ relatively longer and segment iv. dusky. Rostrum reaching to third coxæ, dark. Cornicles pallid and not quite so long as segment iii. of antennæ. Cauda and anal plate very similar; also papillæ on body but fewer (5). Legs relatively longer and with dark coxæ.

*Length* 1.3 to 1.8 mm.

*Alate viviparous female*. (fundatrigenia). Head and thorax deep blackish-brown; abdomen reddish-yellow to dull ochre, with brown central area, deeper brown lateral spots and brown apex. Antennæ deep brown, not quite so long as body. Cornicles brown to almost black. Anal plate and cauda dark. Legs pale

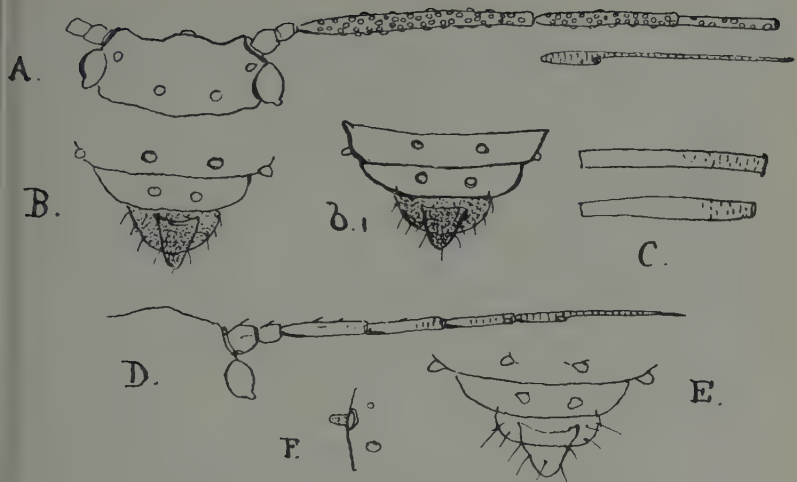


Fig. 134.—*Anuraphis sorbi* Kaltenbach.

A. Head and antenna of alate ♀; B. and b<sup>1</sup> Apex of body; C. Cornicles; D. and E. of apterous ♀; F. Lateral papilla.

reddish-brown to yellowish-brown, most of femora dark, apices of tibiae dark and the tarsi. Wing insertions pale; costa yellowish brown; stigma same colour; veins paler. On last abdominal segment are 2 papillae and on the penultimate 2. Cornicles rather long and cylindrical, about as long as antennal segment v.; imbricate. Cauda small, triangular, with a few hairs. Anal plate rounded, with many pale hairs. Rostrum reaches to second coxae or just beyond. Segment i. of antennae longer than ii.; iii. longer than iv., not so long as vi., with 52 to 60 sensoria; iv. a little longer than v., with 27 to 30 sensoria; v. with 5 to 10 sensoria; vi. the longest, basal area not quite half of v.; flagellum long. Lateral abdominal papillae very small.

Length 1.8 to 2 mm.

FOOD PLANTS. *Sorbus aucuparia*.

LOCALITIES. Great Salkeld, Cumberland, 30 iv. 12 (Britten); Wye, 7 vii. 14 (F.V.T.); Camberley, 12 viii. 16 (Green); Oxshott, 19 v. 23 (Laing).

Observations. This is a very marked species and has been confused in America and this country with the Apple Leaf Curler

or Blue Bug (*A. roseus*). The pale cornicles at once separate it. The fundatrix occurs on the Mountain Ash in April and is found singly under the leaves where she produces apterous viviparæ. and in the next generation, nymphæ, which become alate migrants in July and fly away. The second host plant is not known. Buckton (Mono. Brit. Aphid., II., 58, p. LIV., figs. 3-5) records finding it under the leaves of the Service Tree in October, alate viviparous females and oviparous females. His slides in the British Museum labelled (73) C.U. are specimens of *prunifoliæ* not *sorbi*. With regard to the papillæ on the alate females I have seen they always occur, but do not always show in balsam mounts, unless previously treated with potash.

#### ANURAPHIS ROSEUS Baker.

*Aphis malifoliæ* (Fitch) Auctt.

*Aphis sorbi* Sanderson and Walker (non Kalt.)

*Aphis pyri* Boyer (of Koch).

*Aphis pyri* Gillette and Taylor (non Boyer).

*Aphis mali* Buckton (part).

Fitch, 1st Rept. Nox. and Ben. Ins., N.Y., 49 (1855)=*malifoliæ*; Fabricius, Syst. Ent., IV., 216, 29 (part) (1774); Walker, Ann. Mag. Nat. Hist., Ser. 2, V., 276 (1843); Gehin, Metz. Bull. Soc. Hist. Nat., IX., 269-272 (1860); Buckton, Mono. Brit. Aph., II., pl. 4, figs. 1-3, 4 and pl. LXIX. (1879); Thomas, 8th Rept. St. Ent. Illinois, 86 (1879); Taschenberg, Prakt. Ins. Kunde, V., 55 (1880); Martel, Elbeuf. Bull. Soc. étud. Sci. Nat., XIV., 5 (1894); Fuckens, Rev. Biol. Nord. France, Lille, II., 437 (1890); Bezzi, Atti. Accad. Sci. Cett. a.r. (3), 5, 27, No. 73 (1899); Britten, Rept. Conn. Agri. Exp. Sta., III., 321 (1900); Lugger, Bull. 69, Minn. Agri. Exp. Sta., 195, pl. XIII., figs. 1 to 3 (1900); Sanderson, Rept. Del. Agri. Coll. Exp. Sta., 149-156, figs. 22 to 25 (1904); Tavares, Broteria, IV., 48 (1905); Theobald, Rept. Eco. Zool., 1905, 28 to 30, figs. 12 to 14 (1905); Insect and Allied Pests of Fruit, 136, figs. 105, 109, 110 (1909); Rept. Eco. Zool., 1910, 35

\* Joshua Major in his "Treatise of the Insects most Prevalent on Fruit Trees," etc., p. 10, 1829: mentions Apple Aphides of various kinds and evidently refer to this species and not to *Rhopalosiphum prunifoliæ* as has been suggested.



(1911); Gillette and Taylor, Bull. 133, Colo. Agri. Exp. Sta., 31 (1908); Patch, Bull. 233, Maine Agri. Exp. Sta., 267 (1914); Theobald, Canad. Ent., 48, 202-213 (1916); Baker & Turner, Journ. Agri. Res., VII., No. 7, 321-342 (1916); Baker, Can. Ent., LIII., 95 (1921).

*Alate viviparous female* (Spring form on Apple). Head black; thoracic lobes deep brown to black; abdomen dull reddish of various shades at base, some yellowish-red, with 4 black lateral spots and a black area on the posterior region; 3 to 4 lateral tubercles before the cornicles.\* Antennæ black, not quite to almost as long as body; segment i. longer than ii.; iii. with 47 to 60 sensoria; iv. scarcely longer than v., with 22 to 35 sensoria; v. with 0 to 10, when present mainly on basal three-quarters; vi. a little longer than iii. Cornicles black, rather long, imbricate, but variable in length. Cauda dusky, conical, small. On segments vii. and viii. of abdomen are 2 pairs of dorsal tubercles. Trochanters yellowish-brown to black; bases of femora and tibiæ pale, apices dark. Veins brownish; insertions of wings pale; venation variable.

*Length* 2 to 2.5 mm.

Sanderson says "abdomen yellowish-red" and figures the alatae with only four pairs of dark lateral spots. All British specimens have a large dark abdominal area as in the return migrant.

*Alate viviparous female* (return migrant). Head and thorax black. Abdomen reddish, with a large dark dorsal area of various extent, often extending from close to the thorax up to the cornicles, at other times quite black; black transverse bars caudad of cornicles and 3 large black lateral spots before cornicles and traces more or less distinct, of one caudad of them. Antennæ black, similar to the spring form. Legs and cornicles same as spring form. No trace of tubercles on segments vii. and viii. of abdomen according to Sanderson, but I find them in all British specimens I have examined and also in American specimens I have had, but they are certainly less pronounced than in the

\* Baker and Turner say general colour, brownish-green, but as I can detect no structural differences between European and American specimens I assume they are only colour varieties.

spring forms. Rostrum reaches to second coxæ. Cauda small and dark. Cornicles vary in length.

*Fundatrix* or *Stem Mother*. Purplish brown to dull reddish, heavily dusted with bluish white powder. Globose. Head and pronotum black. Antennæ black, except segment ii. and base of iii. Legs black, also anal plate, cauda and cornicles. Antennæ much shorter than body; segment iii. longer than iv.; iv. longer than v.; vi. with base shorter than v.; flagellum more than twice as long.

*Length* 2 mm.

*Apterous viviparous female*. Slaty grey, dull ochreous to bluish-black, plum colour, brown, brick-dust red, pink, rosy or almost black. The young may be yellowish-pink, bright pink or brick-dust red, some almost ochre, green or yellowish-green; some are mottled or darkened at the sides. The mature female

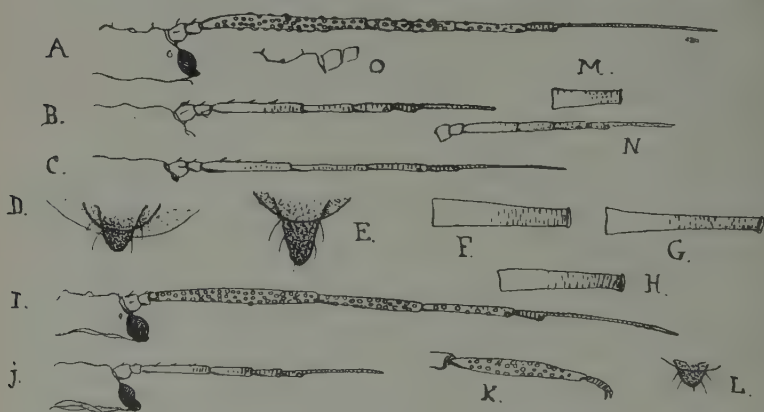


Fig. 135.—*Anuraphis roseus* Baker.

A. Head and antenna of alate ♀ spring migrant; B. of Stem Mother; C. Antenna of progeny of B.; D. Cauda of B.; E. Cauda of A.; F. Cornicle of apterous ♀; H. Cornicle of spring migrant; G. Cornicle of summer migrant; I. Antenna of male; J. Antenna of oviparous ♀; K. Hind tibia of oviparous ♀; L. Cauda of oviparous ♀.

is usually slaty-grey or dull bluish-black, covered with whitish meal; globular. Pronotum with 2 dark tubercles. Abdomen with 5 to 6 (usually 6) pairs of lateral tubercles; segments vii and viii. each with 2 sub-median dorsal tubercles. Antennæ as long or slightly shorter than body, especially in the early broods;

segment i. wider and a little longer than ii. ; iii. longest and iv. longer than v. Cornicles black, rather long, but variable in length, somewhat tapering towards apices ; in others almost uniformly cylindrical, imbricate ; in certain stages somewhat paler at base. Segments vii. and viii. of abdomen show in some specimens a darker plate which bears the papillæ. Legs pale grey to pale brownish-green ; apical half of mid and hind femora black, also apices of tibiæ and the tarsi. Antennæ dark brown, almost white at base. Rostrum reaching to second coxæ. Cauda dark.

*Length 2 to 2.2 mm.*

*Nymph.* Pink, reddish-yellow or salmon colour, with fine white mealy covering. Apices of cornicles and wing-pads dark. Base of antennæ and legs paler.

*Oviparous females.* Apterous. Yellow to greyish or dull greenish-yellow. Head darkened. Antennæ nearly as long as body ; segment i. larger than ii. ; iii. longer than iv., not quite so long as vi. ; iv. a little longer than v., about half of iii. ; vi. a little longer than iv. + v., basal area about half as long as v., yellowish to pale greenish ; v. and vi. smoky. Cornicles straight, cylindrical,

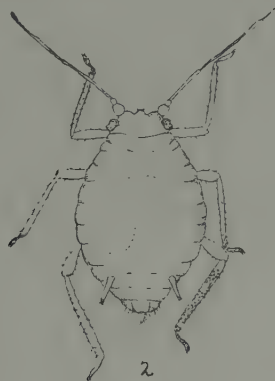


Fig. 136.—*Anuraphis roseus* Baker.  
Oviparous female.

about as long, but thicker than antennal segment iv. ; pale yellow to dusky yellow, apices dusky, imbricate. Fore and mid legs yellow to yellowish-green, except the tarsi, tips of femora and tibiæ which are dark ; hind tibiæ broadened, dusky except at base, with 45 to 50 sensoria over whole surface. Rostrum yellow, apex

dark, reaching to about third coxæ. Cauda small, pale, blunt ; 2 pairs of lateral hairs. A small papilla each side between mid and hind legs.

*Length* .8 to 1 mm.

*Male.* Alate. Head and thorax dark, somewhat shiny. Abdomen small, dark in centre, dull reddish in places, dark lateral spots. Cauda and anal plate dark. Penis pale yellowish. Antennæ a little longer than body, deep brown ; segment i. larger than ii. ; iii. long, as long as or longer than vi., with 45 to 50 sensoria ; iv. longer than v., with 18 to 25 sensoria ; v. with 7 to 10 ; flagellum nearly six times as long as base of vi., which is one-third of v. Rostrum reaches second coxæ. Cornicles black, cylindrical, rather narrow, imbricate, a few apical striæ.

*Length* 1.5 mm.

FOOD PLANTS. Apple ; Pear and Hawthorn ; *Plantago* spp. Walker gives *Sorbus aucuparia* and *S. domestica* ; Passerini *S. torminalis* ; *Rumex* spp., *Viburnum opulus*, *Cydonia vulgaris*.

LOCALITIES. General over Great Britain and Ireland. Most parts of Continental Europe and in North America.

*Observations.*—This Aphid winters in the egg stage on the Apple and Pear and apparently a few on Hawthorn. It hatches out in late March and April. The young at first live freely on the opening buds, on the young unfolding leaves and tender growth. As they mature into the apterous "Mother Queens," the leaves curl up and partially enclose them, some few remain exposed on the leaves below. The Mother Queens soon produce living young, often with great rapidity ; their larvæ as they grow cause the leaf to curl right up, the distorted leaf often becoming a living mass of apteræ. By their constant sucking the foliage becomes more and more contorted and eventually the leaves turn brown and may or may not fall off. It also feeds on the shoots and deforms them ; the internodes are shortened and a very "stubby" appearance is produced, especially on young stock. The fruitlets are also attacked and ruined. The alatæ appear in late May, June and on into July. Although these plant lice become alate in masses, a few always occur before the main swarm and some later. The alate females are very sluggish and like those of *Aphis rumicis*



Fig. 137.

Apple Shoot attacked by *Anuraphis roseus* Baker.

collect together in masses, usually selecting the under sides of large branches, near their junction with the trunk. Many of these groups of alatae were noticed in 1915 to die off and remained attached to the branches, having been killed by a fungoid enemy. Most of the alatae fly away, however, in July. This insect nearly dies out on the Apple and Pear by mid July, but some remain right on until autumn and give rise to the sexuales, which are augmented by the return migrants. To what plants they migrate we do not know in this country. In Canada they go to the roots,

etc., of the Plantains (*Plantago spp.*). Transfers in this country have completely failed after many attempts. I have had this species sent me once from Dock roots and Mr. Laing has shown me some also from that plant. Mr. Massee of East Malling, has also transferred *roseus* to dock roots but obtained no alate ♀♀. I failed to do so. Hundreds of dock roots have been examined but no *roseus* found on them. Generally in September and October alatae fly back to the fruit trees, etc., and produce the sexual forms. A few return migrants may be found on the Apples in September, but most in October. Young are produced and these become oviparous females and alate males appear later. These sexual forms may even occur into December. They collect under the leaves. When the females are fertilised they crawl to the shoots to lay their eggs, either singly or in small groups. Many females fall with the ripe leaves before they have oviposited and lay their eggs on the leaves as they lie upon the ground. The ova are at first yellowish, but soon become black.

In some years this Aphid does a great deal of harm to the Apples and now and then to Pears; many crops of fruit have been quite ruined by them. There is much variation in colour; some apteræ being all slaty black, others bluish black, plum colour, dull blue, brown or pale red or pinkish. There is also variation in length of antennæ and cornicles in different stages. There seem to be two main varieties, one with antennæ and cornicles short in the apteræ, the other with them fairly long. It is often spoken of as the Blue Bug or Rosy Apple Aphis. Several colonies I once managed to transfer to the Guelder Rose (*Viburnum opulus*), but they died out (Journ. Bd. Agri., XXVI., 66-67, 1919).

This common Aphid was first taken to be the *A. sorbi* of Kaltenbach in America, a totally different insect with pale cornicles in the apteræ. Walker's *sorbi* on apple Mr. Laing tells me is *roseus* and also his specimens from the Service Tree, Baker renamed *malifoliae* as *roseus* (Canad. Ent., 53, 95, 1921) because an examination of the type of *malifoliae* Fitch showed that it was the same as *cratægifoliae* Fitch.

*Natural Enemies.* Many natural enemies attack this aphid. Towards the end of June *Coccinellid* larvæ, many *Syrphids* and now and then *Chrysopid* larvæ may be found feeding on them.



By the first week in July these natural enemies have often become so abundant that the Blue Bug is cleared out ; but by this time most of the damage has been done to the foliage and fruit. The chief natural checks I have found to be *Adalia bipunctata*, *Coccinella septem-punctata* and the Syrphids—*Catabomba pyrastri*, *Syrphus ribesii* and *S. grossulariæ*. In 1906 a small larval bug did very much good. A few Cecidomyiid larvæ may also often be observed feeding upon them.

Spraying has little effect on this pest when once the leaves are curled. Nicotine and soft soap affect a certain number, but never completely controls it. The best results have been obtained with Carbolineum washes in winter to kill the eggs.

#### ANURAPHIS HERACLEI Koch.

##### *Aphis heraclei* Koch.

Koch, Die Pflanz., 50, figs. 64-65 (1854) ; Schouteden, Mém. Soc. Ent. Belge, XII., 221 (1906) ; non *heracii* Cowan (= *heraclella* Davis).

*Alate viviparous female.* Antennæ a little shorter than body ; segment i. larger than ii. ; iii. longer than iv., about equal vi., sensoria 58 to 66 all over it ; iv. a little longer than v., sensoria 21 to 25 all over ; v. not quite twice base of vi. sensoria 0 to 5 + 1 ; flagellum about equals iv. + v. Rostrum reaches to or past third coxæ. Cornicles rather short, about equal to segment v., darkened, slightly constricted base and apex. Cauda small, bluntly triangulate, 2 hairs each side, 1 dorso-apical. Two pairs sub-median dorsal papillæ near apex ; 5 pairs lateral abdominal papillæ. Wings normal. Legs rather long and thin.

*Length* 2 mm.

*Apterous viviparous female.* Head and pronotum dark ; body dusky ochreous, a large dark patch between cornicles and many small dark spots on body, seen in cleared specimens. Antennæ, legs, cornicles, anal plate and cauda dark. Antennæ shorter than body, but variable in length ; i. wider than ii. ; iii. longer than iv., nearly as long as iv. + v. ; iv. a little longer than v. ; v. about two-thirds of base of vi. ; flagellum longer than iv. + v., a few hairs on i. to iv. and on head. Rostrum to third coxæ ; acuminate. Cornicles rather short and thick, not quite so long as antennal segment iii., a little longer than iv., cylindrical,

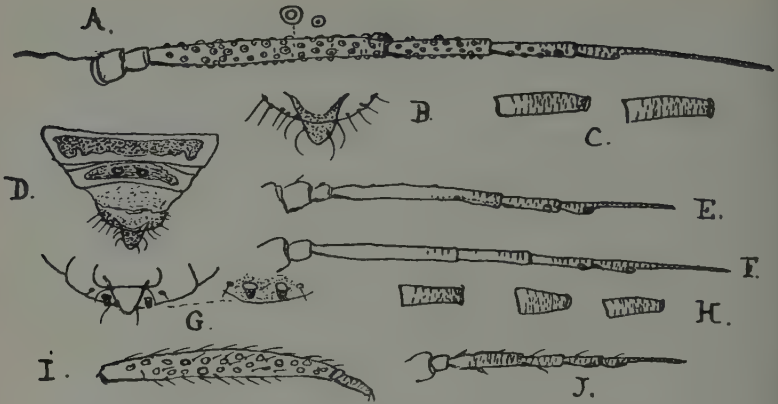


Fig. 138.—*Anuraphis crataegi* Kaltenbach.

A. Antenna of alate ♀; B. Cauda and anal plate; C. Cornicles; D. Apex of body; E. and F. Antennæ of apterous viviparous ♀; H. Cornicles; G. Apex of apterous ♀; I. Hind tibia of oviparous ♀; J. Antenna of oviparous ♀.

constricted towards apices. Cauda short, wide, bluntly triangulate; 2 hairs each side. Anal plate with several hairs. Two pairs of marked median papillæ towards apex of abdomen. Legs moderately long; many hairs on tibiæ and apices of femora. Body with short hairs, especially arising from the dark pigmented spots. Small black lateral papillæ.

Length 2.5 to 2.8 mm.

FOOD PLANTS. Hog Weed (*Heracleum spondylium*) and *Daucus carota*.

LOCALITIES. Wye (F.V.T.), 17 vi. 25; Surrey (Laing); Germany (Koch).

*Observations.* Found on the roots of Hog Weed and *Daucus carota*. It bears some resemblance to *A. roseus* Baker, but the apteræ when cleared do not seem the same and all attempts to transfer *roseus* to the Hog Weed have failed. This is not the *heraclei* of Cowan, which Davis has re-named *heraclella*.

ANURAPHIS CRATÆGI Kaltenbach.

*Aphis crataegi* Kaltenbach.

Kaltenbach, Mono. Pflanz, 66 (1843); Tullgren, Upp. Prak. Ent., 59, 76 (1907); Theobald, Entomologist, XLIV., 403 (1911);

Theobald, Rept. Eco. Zool. for 1911, 34 (1912); Van der Goot, Tijds. V. Ent., 56, 104 (1913); Theobald, Entomologist, XLVIII., 258 (1915); Theobald, Canad. Entomo., XLVIII., 210 (1916); Baker and Turner, Jour. Agr. Res. VII., 322 (1916).

*Alate viviparous female.* Black, shiny, with a band covered with snow white meal at base of abdomen, beneath which it is pure white, creamy white, pale pink or very rarely pale greenish; on this pale area are a few dark spots; the posterior part of abdomen may be pale colour, with narrow transverse dark bars and there is one pair of sub-median dorsal papillæ caudad and five pairs of black papillæ before cornicles. Venter pale whitish-pink, covered with white meal. In cleared specimens beyond the dark median dorsal patch on basal half are dark bars and some spots before it. Antennæ black, shorter than body; iii. with 64 to 70 sensoria; iv. with 25 to 32; v. 3 to 7 + 1. Rostrum to third coxæ. Cornicles black, rather short, about as long as antennal segment v., cylindrical, in some slightly expanding basally, others constricted at apices, imbricate. Cauda black, blunt, 2 pairs of lateral hairs. Legs black, except bases of femora, which are yellow. Wing insertions yellowish.

*Length* 1.8 to 2 mm.

*Apterous viviparous female.* Black, dark brownish black, green or greyish-green, covered with fine white or bluish-white meal; when denuded some are shiny. Antennæ shorter than body, of five to six segments; iii. when of 5 only very long. Venter deep greenish. Cauda and cornicles black, the latter short. Legs black. Two large black apical papillæ.

*Length* 2 mm.

*Oviparous female.* Apterous; dirty yellow to ochreous or fawn colour; legs and antennæ dusky. Antennæ much shorter than body; i. larger than ii.; iii. longer than iv. not quite so long as vi.; iv. and v. about equal; base of vi. small, flagellum about as long as vi.; iii. to vi. markedly imbricate, a few hairs. Legs moderate, hind tibiæ rather broad, with round sensoria all over surface, hairy. Cornicles dark, cylindrical, rather short, about as long as segment iv., in some broader at base than apex. Cauda dusky, short, just projecting beyond the anal plate; 4 hairs one side, 2 the other. Anal plate dark.

*Length* .5 to .8 mm.

FOOD PLANTS. *Pyrus malus*; *P. communis*; and *P. oxyacantha*.

LOCALITIES. Wye, 23 v. 14; Maidstone, 10 vi. 27; Marden, Kent, 1909 and 17 vi. 1927; Haddenham, Cambs., vi. 05 and v. 25 (F.V.T.); Mortimer, Bucks., v. and vi. (Lake); Wisbech, vi. 26 (Petherbridge); Long Ashton, 21-30 iv. 11; Huddersfield, 5 v. 14 (F.V.T.); Windermere, 12-23 v. 14 (Rymer Roberts).

*Observations.* This aphid produces galls or blisters on the leaves of its food plants, which become yellowish and red or rosy-pink; at one time the mid region of the leaf is deformed, at others



Fig. 139.

Apple foliage attacked by *Anuraphis crataegi* Kalt. producing bright red curled leaves.

the leaf may be bent over at the edges, or any part may become abnormal; beneath and between the galled areas the plant lice feed and breed. This insect I found at Marden in Kent in 1909 and it has occurred in later years, but not in such abundance until 1927; in this locality it has done much damage to the Apples. In 1909, I recorded it as *sorbi* (Kaltenbach). I also found it in abundance at Wye on both Apple and Hawthorn between May 7th and June 10th. It has recently done considerable damage to both Bramley Seedling and Worcester Pearmain apples near Maidstone. Alatae were sent me by Mr. Rymer Roberts from Windermere on May 23rd. Mr. Petherbridge finds it common in parts of the Wisbech area of Cambridgeshire. Buckton's *Aphis crataegi* of Kaltenbach (Mono. Brit. Aphid., II., 35, pl. XLVII., figs. 1-3) is certainly not Kaltenbach's species. The egg laying females occur in summer, just like *Aphis saliceti* (Kalt.). The oviparous females wander about on the leaves and shoots. Those kept in the insectary from Marden occurred at the end of June, but no eggs were laid until July 7th. No males have yet been found. Van der Goot suggests that *crataegi* is the same as Kaltenbach's *ranunculi*. I make them quite distinct. Definite trees are attacked annually by it, the whole life cycle being spent entirely on the Apple trees.

#### ANURAPHIS RANUNCULI Kaltenbach.

##### *Aphis ranunculi* Kaltenbach.

Kaltenbach, Mono. Pflanz, 69, 50 (1843); Pflanzen Feinde, 10 (1874); Del Guercio, Redia, IV., 191 (1909); Van der Goot, Tijdschr. v. Entomo., LVI., 104 (1913); Theobald, Entomologist, XLVII., 102 (1914); Schouteden, Mem. Soc. Ent. Belge, XII., 226 (1906); Macchiati, 257 (1883).

*Apterous viviparous female.* Green to dusky green, to some extent mealy. Antennae much shorter than body. Cornicles rather short, brown. Cauda and anal plate almost black. Legs dull green to brown, base of femora yellow; fore legs palest. Antennae rather short; i. wider than ii., but no longer; iii. longer than iv., thick, not so long as vi., several with short hairs; v. longer than iv., with 3 short hairs; vi. longer than iv. + v., imbricate. Eyes large. Head with short hairs, slightly raised

each side. Cauda short, often hidden under apex of body; anal plate rounded with a few short hairs. Cornicles dark, cylindrical, somewhat expanded basally, about as long and much thicker than antennal segment iii. Legs short, rather thick especially femora; 1st and 2nd pairs widest apart; 2nd and 3rd close together; tibiæ hairy. Rostrum past second coxæ. Body with hairs arising from papillæ and with rather large rounded lateral processes.

Length 2 to 2.3 mm.

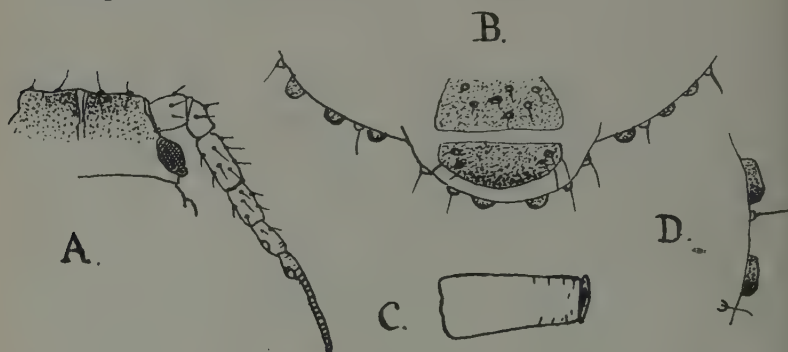


Fig. 140.—*Anuraphis ranunculi* Kalténbach.

A. Head and antenna of apterous ♀; B. Apex of body; D. Further enlarged lateral papillæ; C. Cornicle.

*Alate viviparous female.* Head and thorax deep brown, a pale prothoracic band; abdomen dull greenish with dark lateral spots, a large dark area and a dark band in front and dark bars behind cornicles. Antennæ pallid olive green. Legs pale olive green, fore pair all pallid, mid and hind with dusky apices to tibiæ and dusky tarsi. Cauda, anal plate and cornicles dark. Antennæ a little shorter than body; segment i. wider but no longer than ii.; iii.

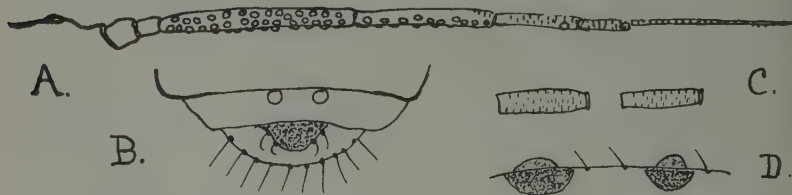


Fig. 141.—*Anuraphis ranunculi* Kalténbach.

A. Antenna of alate ♀; B. Apex of body; C. Cornicles; D. Lateral papillæ.



considerably longer than iv. with 38 to 48 sensoria all over segment; iv. with 10 to 16 all over it; v. with 0 + 1; iv. much longer than v.; flagellum of vi. nearly equal to iii. Rostrum acuminate, reaching second coxæ, with several spine-like hairs. Cornicles cylindrical, contracted at base and apex, markedly imbricate, about as long as antennal segment v. Cauda small, bluntly triangulate, 2 hairs each side. Anal plate rounded, with rather long hairs. Two small sub-median dorsal papillæ and 5 pairs of dark rounded lateral papillæ. Legs with many short spine-like hairs. Wing venation normal.

*Length* 1.5 to 1.8 mm.

FOOD PLANTS. Roots of *Ranunculus acris*, *R. repens*, *Taraxacum* and *Rumex*.

LOCALITIES. Wye, 17 viii. 10; 20 x. 11; 2 vi. 24 (F.V.T.); Rothamsted, vii. 16 (Davidson); Little Hadham, Herts., 21 viii. 14 (F.V.T.); Bradgate Park, Leicestershire, ix. 12 with *Lasius flavus* (Donisthorpe); Wan Fel, 25 ix. 12 (Britten) in *Lasius fuscus* nest; Aberystwyth, Wales, viii. 26 (Jenkins); Germany, viii. and ix. (Kaltenbach); Belgium (Schouteden); Calabria (Macchiati).

*Observations.* The specimens I have found have been feeding on the roots of *Ranunculus* and *Rumex* attended by ants, *Lasius niger*. The ants were tending the Plant Lice and I watched them carry the pale green young about with them, amongst the tangled roots. The larvæ are pale and have much shorter and broader legs than the adults and antennæ of 5 segments, shorter and broader cornicles and two round spots at the back of the head. Recently Mr. Jenkins has sent me a colony from Dock (*Rumex*) roots from Wales from which I bred alate females in August. The round lateral abdominal processes are very marked in both alatae and apterae. The specimens from Wan Fel and Bradgate Park exactly agree, both being taken in ant's nests. It may be the subterranean race of an allied species, but I cannot connect it with any I know. Kaltenbach says of it:—"Diese Blattlaus lebt unten am Stängel und auch unter der Erde an der Wurzel des Scharfen und Kriechenden Hahnenfussens (*Ranunculus acris* and *repens*)."

## ANURAPHIS AUCUPARIÆ Buckton.

*Aphis aucupariæ* Buckton.

Mono. Brit. Aphid., II., 76, pl. LX., figs. 3-5 (1877).

"*Apterous viviparous female.* Size of body  $2.27 \times 1.28$  mm. ; length of antennæ 1.52 ; length of cornicles 0.25. Varies much in form, some being globose, whilst others are more produced at the tail. Colour brownish-black and wholly black. Abdomen has a tendency to a dark obscure barring. Eyes, legs and nectaries black. The whole insect is finely pilose and sparsely covered with a mealy dust, which in the globose form is disposed somewhat in a crescent shape. Tail very obtuse. *Pupa.* Hoary, ferruginous red. Abdomen reddish, which colour becomes somewhat brighter in the neighbourhood of the nectaries. Wing cases yellow-green, tipped with brown. Legs and antennæ slaty grey. The larva furnished with two marked infra-abdominal teeth. These larvæ were plentiful in the middle of May at Horsham, on the wild Service-tree (*Pyrus torminalis*) and in June many pupæ were found in the same place. The insect may also be found feeding on *Sorbus aucuparia*, but it differs from *Aphis sorbi* of Kaltenbach in several points."

Mr. Laing writes a note as follows : This has four conspicuous precaudal tubercles in the usual two pairs, a strong lateral thoracic one and five lateral abdominal ones, three before and two behind the cornicles. Antennæ except basal two-thirds of iii., which is pale and all the legs dark. Cornicles dark and sub-equal to antennal segment iii. The most characteristic thing about the insect is its pilosity, which stands out very conspicuously in the mounted specimen, the hairs being fairly long and arising from minute tubercles ; even in the immature insect the setæ are noticeable, as there is a double median row down the abdomen each with a small dark basal area.

WALKER'S SPECIES APPARENTLY belonging to *Anuraphis*.

## APHIS TRIPHAGA Walker.

List. Homop. (B.M.), IV., 1041, 313 (1852).

"*Wingless viviparous female.* Small, spindle-shaped, very variable in colour, being either black, dark olive-green or dull red, always covered with white bloom ; feelers black, pale yellow

towards the base, hardly half the length of the body ; mouth pale yellow, with a black tip ; nectaries white, hardly one-tenth of the length of the body ; tips black ; legs pale yellow, moderately long ; knees, feet and tips of shanks black. On *Epilobium*."

APHIS ROBUSTA Walker.

Zoologist, VII., App. XLIII. (1849).

"*The winged viviparous female*. The body is deep black, larger and stouter than that of *A. capreae*, which also infests the Parsnip ; the antennæ are black and much shorter than the body ; rostrum green with a black tip ; the tubes are black and about  $\frac{1}{8}$  of the length of the body ; the legs are black and moderately long ; the tibiæ except the tips are yellow ; the wings are colourless and nearly twice the length of the body ; the squamulæ are pale yellow ; the stigma dull buff ; veins brown and their tips slightly clouded.

*The wingless viviparous female*. When young very dark green or almost black ; antennæ and legs short and stout ; the tubes are very short ; the body soon becomes quite black and increases in breadth and thickness.

FOOD PLANT. Parsnip (*Pastinaca sativa*)."

I have been unable to find the type in the British Museum. Walker gives no date or locality.

APHIS CONSPERSA Walker.

Zoologist, VII., App. XLVI. (1849).

"*The wingless viviparous female*. The body is small, oval, slightly convex, smooth, shining, pale yellow, sprinkled with red spots ; the antennæ and the rostrum are pale yellow, with black tips and the former are less than half the length of the body ; the eyes are black ; the tubes are yellow, with black tips and are less than one-twelfth of the length of the body ; the legs are pale yellow and rather short ; the knees and tarsi are dark."

Field Scabious (*Scabiosa arvensis*).

APHIS (ANURAPHIS ?) PEDICULARIS Buckton.

Mono. Brit. Aphid., II., 41, pl. XLVIII., figs. 4-5 (1877).

"*Apterous viviparous female*. Size of body  $1.64 \times 1.01$  ; length of antennæ  $1.01$  ; length of cornicles  $0.25$ . The general

colour is dull yellowish-green ; form broadest across the nectaries. Head convex. Eyes brown. Abdomen very transparent, showing the underlying tracheæ like a plaiting of silver threads. Embryos also visible through the skin. Nectaries and legs stout, the last a little clouded at the tips of the femora and tarsi. Tail large, green and hairy. Rostrum reaches nearly to the second coxæ. Body slightly mealy. The young just born, measure  $.025 \times 0.012$  inch. The nectaries are at this time very short, whilst the rostrum reaches considerably beyond the third coxæ.

Found numerously between the seed pods of the Louse-wort (*Pedicularis palustris*), in the Norfolk fens about the middle of July. No winged forms could be secured at this time, and I have failed to procure them since." (Buckton.)

#### Genus ASPIDAPHIS Gillette.

Gillette, *Canad. Ent.*, XLIX., 196 (1917) ; Baker, *U.S. Dep. Agri. Bull.*, 826, 44, pl. VI., L.O. (1920).

Antennæ short, of 5 segments, with sub-circular sensoria. Head without prominent antennal tubercles. Cornicles very small, somewhat swollen near distal extremities and with the opening in the side of the cornicle, not at the apex. Abdomen with a dorsal caudal tubercle developed into a large conical process extending beyond and fully covering the cauda in the apteræ. Body elongate. Venation normal.

*Type. Aspidaphis polygoni* Gillette.

#### ASPIDAPHIS ADJUVANS Walker.

*Aphis adjuvans* Walker.

*Aphis polygoni* Walker.

Walker, *Zoologist*, VI., 2220 (1848) and 2249 (1848) ; Laing, *Ent. Mo. Mag.*, LVII., 125 (1921).

Walker's description of *adjuvans* is as follows :—

" *The oviparous wingless female.* The body is granulated, elliptical, buff, tinged with red, and is narrower and longer than the preceding species (*familiaris*) ; the head is crenulated or dentate in front and there are two little black dots between the eyes ; the antennæ are pale yellow, with black tips and about  $\frac{1}{4}$  of the

length of the body ; the legs are pale yellow ; the hind tibiæ are brown."

The description of *polygoni* is as follows :—

"*The wingless oviparous female.* Sluggish, small, dull-brown, brownish-yellow on each side, fusciform, granulated, narrow, rather flat, the front of the head is notched ; antennæ pale yellow, black towards the tips and nearly  $\frac{1}{4}$  the length of the body ; first and second joints brown ; third and fourth white ; seventh fully as long as sixth ; rostrum pale yellow ; its lips and the eyes are black ; abdomen shorter than thorax, which is much developed ; legs short and pale yellow ; the tips of the tarsi are black ; hind tibiæ brown.

*The wingless male.* It is smaller and more depressed than the female ; the antennæ are black and about half the length of the body."

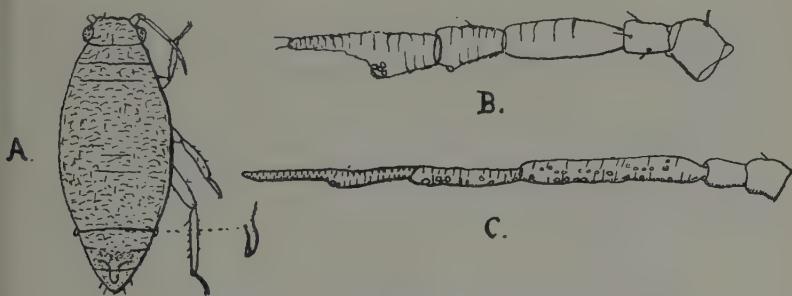


Fig. 142.—*Aspidaphis adjuvans* Walker.

A. Apterous viviparous ♀ ; B. Antenna of ♀ ; C. Antenna of ♂. (Laing.)

Laing redescribes the oviparous female of *adjuvans* as follows :  
 "Antennæ a little more than one-fourth the length of the body, with very few spines, the primary sensorium on segment v. compound ; proportions (average of six specimens) 15, 14, 42, 22 (22 + 23) ; total length .55 mm. Rostrum reaching to mid coxæ. Abdomen devoid of markings, glabrous, in potashed specimens showing slight rugosity ; dorsal shield completely covering tail. Cornicles recumbent, half the length of the hind tarsi. Legs, mid and hind coxæ robust, hind tibiæ not very much dilated, with about 20 sensoria ; length of hind leg, trochanter + femur .34 mm. ; tibia .48 mm. ; tarsus + claw .16 mm. Total length 2 mm. ; breadth 1 mm.

*Apterous male* (of *A. polygoni*). Smaller and more depressed than the female. Antennæ black, segment iii. with about 20 secondary sensoria; iv. with 13; proportions of segments 15, 16, 65, 44 (30 + 31); total length .8 mm. Abdomen very rugose, markedly free from hairs; sides of abdomen more pallid than in female. Dorsal shield does not appear to completely cover the cauda, but may be due to the shrinkage of the specimen. Total length 1.5 mm."

Laing says he can find no difference between *A. adjuvans* and *A. polygoni* he sends me the following note:—

"I am doubtful about Gillette's name *polygoni* standing. Theoretically now that Walker's *polygoni* is placed in the genus *Aspidaphis*, Gillette's species, if distinct, requires a new name. Though Walker's *polygoni* may be a synonym of *adjuvans*, this does not, of course, affect the question."

#### Genus BRACHYCOLUS Buckton.

Buckton, Mono. Brit. Aphid., II., 146 (1879); Baker, "Bull. 826, U.S.A. Dep. Agri., 45 (1920).

Body more or less elongate and linear. Antennæ short, of 6 segments. Cornicles very small. Cauda conical, prominent. Anal plate rounded. Wing venation normal. Sensoria of alate female antennæ rounded. Head flattened or with a slight median process. Eyes large; ocular process prominent. Rostrum rather short, reaching to or nearly to second coxæ. Legs of apteræ rather short, very short in some species, i.e. not passing beyond end of abdomen.

Buckton's original description is as follows:—

"Vertex rather flat, frontal tubercles none. Antennæ very short, seven jointed. First and second joints globose; third, fourth, fifth and sixth nearly equal; seventh slightly ringed and about as long as the fifth and sixth together. Body very long and narrow, mealy. Nectaries very small and inconspicuous. Cauda moderately long and pointed. Legs very short, hind pair scarcely projecting beyond the apex of the abdomen. Tarsi rather long. Rostrum very short, hardly reaching the second coxa." Buckton made this genus to receive Hardy's *Aphis stellariæ*. It can easily be told by the short cornicles and somewhat elongate body and short antennæ.



Baker sinks Van der Goot's genus *Brachysiphum* under *Brachycolus*, a genus founded on Koch's *Aphis thalictri*, but it does not seem to me to be the same, certainly Koch's figures of *thalictri* do not agree with *Brachycolus*. Two species occur in Great Britain, which I make distinct, namely *B. stellaris* and *B. holci*, both of Hardy. They form marked abnormal growths on *Caryophyllaceæ* and *Holcus*. Schouteden sinks *holci* under *stellaris*.

BRACHYCOLUS STELLARIÆ Hardy.

*Aphis stellaris* Hardy.

Hardy, North British Agriculturalist, II., 788 (1850) ; Buckton, Mono. Brit. Aphid., II., 147, pl. LXXXIV., figs. 1 to 3 (1877) (part I.).

*Apterous viviparous female*. Body elongated oval ; yellow to dull yellowish-green, covered with fine grey or white farinose matter. Antennæ much shorter than body, of 6 segments ; i. larger than ii. ; iii. long, but not quite so long as vi. ; iv. small, scarcely half iii. ; v. a little longer than iv. ; vi. longest, basal area about equal to v., flagellum longer than basal area ; all the segments with short hairs. Rostrum reaches second coxæ. Eyes black, prominent. Legs moderately long, green ; tarsi slightly dusky. Cauda and anal plate green, with a few hairs. Body with four small lateral processes. Cornicles very small.

Length 1 to 1.4 mm.

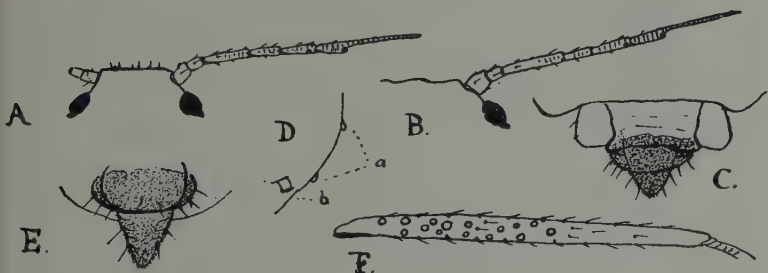


Fig. 143.—*Brachycolus stellaris* Hardy.

A. Head and antenna of oviparous ♀ ; B. of viviparous ♀ ; C. Cauda and anal plate of B. ; D. Cornicle (b) and lateral papillæ (a) of apterous viviparous ♀ ; E. Hind tibia of oviparous ♀ .

*Oviparous female.* Apterous, pale yellowish to yellowish-green. Rather more elongated-oval than viviparous female. Antennæ much shorter than body, of 6 segments, dusky; i. a little longer than ii.; iii. rather short, about as long as v.; iv. a little more than half iii.; vi. much the longest, nearly equal to iii., iv. and v.; its basal area nearly as long as v., flagellum nearly three times as long as base. Front of head slightly dusky, with a median process and a few short hairs. Eyes rather large and prominent, black. Rostrum dusky, reaching to second coxæ. Apex of body sometimes darkened. Cauda green, conical. Anal plate rounded, darker than cauda, both with a few hairs. Cornicles small, green. Legs rather short and thick, darker than body; hind tibiæ not much enlarged, with many faint round sensoria; hairs short. The abdomen shows small lateral processes as in the viviparous female.

*Length* 1.2 to 1.6 mm.

FOOD PLANTS. *Stellaria holostea*, *S. graminea* and *Cerastium triviale*.

LOCALITIES. Rothamsted, 9 x. 17; Camberley, 20 viii. 16. Putney, New Forest; Oxshott; Midhurst; Lynton; Birmingham; Aberdeen and district.

*Observations.* This insect was described by Hardy as *Aphis stellariæ*, later in the same year he described an *Aphis holci* and this he later considered the same as *stellariæ* as he found it ovipositing on *Caryophyllaceæ*. Recently I have received a *Brachycolus* from Scotland which occurs on *Holcus*, which oviposits on that and other grasses and I find the oviparous females differ. I have thus retained Hardy's two species for they are certainly distinct. *Stellariæ* lives in leaf tufts at the tips of the plants. Hardy states "*Aphis stellariæ* is eminently social and is not unworthy the notice of the vegetable physiologist from the parts of the plants in which it nestles undergoing a fantastic disarrangement. Its favourite plant is the Stitchwort, *Stellaria holostea* and *S. graminea*, on which it is found within a hollow pod fabricated from the leaves, each side of the leaf being brought together above to form a canopy. It checks the growth of the shoot in such a manner that the leaves cluster into rigid tufts; vegetable irritation completes the structure." Then he says that

during the summer it migrates from the Stitchwort to one of the grasses, *Holcus mollis*, where it revels in the centre of a tuft of leaves, which embrace each other at their bases, like those of a sedge. In the autumn it reverts to the *Caryophyllaceæ*. On the 4th of October he observed it on the terminal shoots of *Cerastium triviale*, whose leaves were similarly clustered in a boat-like form. The females were then engaged in depositing their eggs—minute black, oblong-oval bodies. Whether the species I describe here flies to grasses I do not know, but the common *Holcus* insect which I take to be Hardy's *holci* oviposits on that and other grasses and the oviparous females are very distinct.

BRACHYCOLUS HOLCI Hardy.

*Aphis holci* Hardy.

*Brachycolus stellariæ* Hardy (part).

Hardy, North British Agriculturalist, II., 531 (1850) ; Buckton, Mono. Brit. Aphid., II., 147 (1877), part.

*Alate viviparous female*. Green with dusky head and dark thorax ; antennæ and legs green. Antennæ scarcely reaching to end of thorax, of 6 segments ; i. a little longer than ii. ; iii. about twice as long as iv., a little shorter than vi., with 5 to 7 round sensoria in a line ; iv. with 0 to 2 sensoria ; v. shorter than iv. ; vi. with base nearly half length of flagellum ; a few scattered hairs. Head slightly raised in middle ; eyes dark, large ; median ocellus distinct. Rostrum broad, scarcely reaching second coxæ. Cauda and anal plate darker than abdomen.

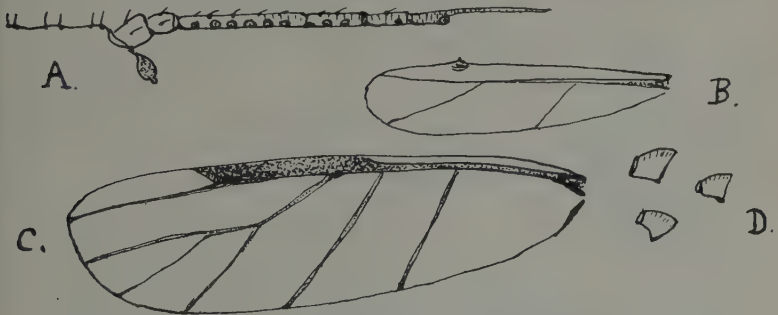


Fig. 144.—*Brachycolus holci* Hardy.

A. Head and antenna of alate ♀ ; B. and C. Hind and fore wings ; D. Cornicles.

Cauda rather elongate. Anal plate broad, rounded, both with a few short hairs. Legs moderately long. Small cornicles green.

*Length* 1 to 1.2 mm.

*Apterous viviparous female.* Green to dark green, elongated and rather narrow; segments well marked, especially of thorax. Antennæ very short, reaching just past second coxæ; segment i. larger than ii.; iii. about twice as long as iv.; iv. and v. about equal; vi. longer than iii., flagellum not quite twice as long as base; all with a few hairs. Eyes large and black. Rostrum reaches second coxæ. Legs dark, rather short, hairy. Cauda and anal plate dark. Anal plate rounded. Cauda moderately large, conical, blunt, with a few hairs. Body with a few hairs. Cornicles small.

*Length* 1.2 to 1.5 mm.

*Oviparous female.* Apterous. Much elongated and more or less linear. Yellow, tinged with green and covered with white tomentum; head darker, brownish-green; legs and antennæ brown; cauda and anal plate dull greenish-brown to greenish-grey; on segment preceding cauda is a greenish-grey transverse plate and a narrow plate of same colour on the preceding segment and a still narrower one on segment preceding that. Eyes black. Rostrum brown at base, pale in centre and brown

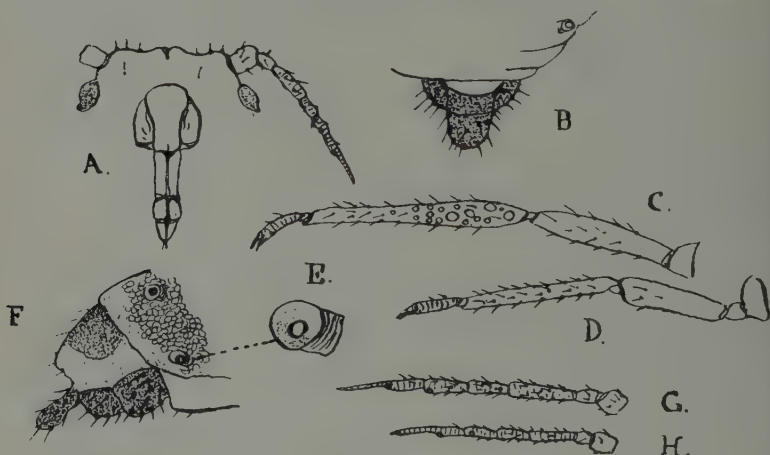


Fig. 145.—*Brachycolus holci* Hardy.

A. Head, etc. of oviparous ♀; B. Cauda and anal plate; C. Hind leg; D. Leg of viviparous ♀; E. Cornicle; F. Apex of body; G. and H. Antennæ of viviparous ♀.

at apex. On venter of abdomen is a greenish-grey blotch and a smaller one just preceding the cauda. Cornicles very small, pale. Head raised. Antennæ of 6 segments; i. larger than ii.; iii. longer than iv.; iv. slightly longer than v.; vi. with basal area as long as v. and the flagellum a little longer. Rostrum short and thick, not reaching second coxæ. Legs shortish, hind tibiæ not dilated, with many pale sensoria; hairy. Cauda dark, bluntly conical, fairly large, with a few hairs. Anal plate broadly rounded. Cornicles short and truncate.

*Length* 1.2 to 1.6 mm.

**FOOD PLANTS.** *Holcus mollis* and *H. lanatus*.

**LOCALITIES.** King's Wood, Wye, x. 26 (F.V.T.); Aberdeen and district; Oxshott, Midhurst (Laing); Windermere vii. 18 (R. Roberts); Inveran, N.B., 26 ix. 20 (D. Jackson); Northumberland and Berwickshire, viii. (Buckton).

*Observations.* Found egg laying in September on *Holcus lanatus* with viviparous and apterous females and alate females by Miss Jackson in Scotland and by Mr. Rymer Roberts at Windermere in August on the same grass. *Stellariæ* oviposits on *Stellaria* in October. The oviparous females differ, in *holci* iv. and v. are equal, in *stellariæ* they are unequal and the body of *holci* is much more linear than in *stellariæ*. Buckton's black form which he figures is a parasitised specimen. Miss D. J. Jackson found the oviparous females in abundance low down on the shoots, beneath the sheathing leaves and in the folds of the leaves, but a few full grown specimens were to be found crawling freely up the long grasses at Inveran, in September. Young found with them were very pale yellowish-green with brownish-grey legs, black eyes and were all covered with fine tomentum. The ones I found in 1926 in King's Wood, near Wye, were apterous viviparæ and young, and occurred in the young leaves more or less curled up.

**BRACHYCOLUS FREQUENS** Walker.

*Aphis frequens* Walker.

Walker, Zoologist, VI., 2219 (1848); Laing, Ent. Mo. Mag., LVII., 127 (1921).

Walker's description is as follows:—"The wingless oviparous female. The body is small, spindle-shaped, flat, narrow, dark

green, somewhat glaucous, mottled with yellow and slightly powdered with white ; the antennæ are black, yellow at base and about one-fourth of the length of the body ; the eyes are dark red ; the rostrum is dull green, black at the base and at the tip ; the tubes do not appear above the surface of the body ; the legs are short and dull yellow ; the tarsi and the tips of the tibiæ are black. The eggs, when newly laid are bright yellow and about one-fourth of the length of the body of the insect.

*The wingless male.* It is shorter than the female, with which it pairs in October ; the antennæ are quite black and about half the length of the body."

Laing gives the following description of the oviparous female : "Long, narrowly oval, green powdered with white ; head of a

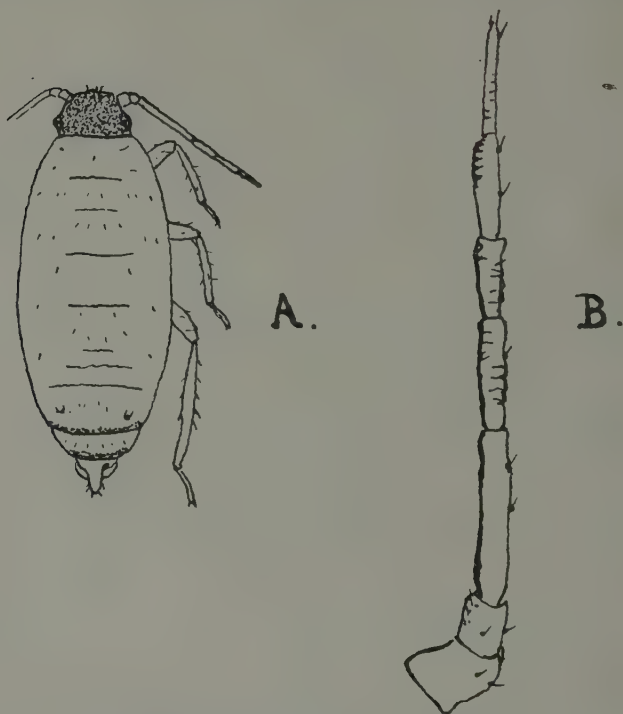


Fig. 146.—*Brachycolus frequens* Walker.  
A. Oviparous ♀ ; B. Antenna of same (after Laing).



darker green than remainder of the body; proportions of segments 15, 15, 45, 26, 25 (25 + 35); a few scattered spines on all segments, 3 at tip of spur. Head (in cleared specimens) densely chitinated, gently rounded in front, with a few scattered spines. Rostrum reaching to mid coxæ. Abdomen with 7 pairs of sub-marginal spiracles, standing out clearly in cleared specimens on account of the small chitinated areas surrounding them; last two segments as strongly chitinated as the head, whole dorsum with a few short setæ. Cornicles very short, no longer than broad, about half the breadth of the base of the tail. Cauda normal aphidine, of medium length. Legs rather short, hind tibiæ with about 20 small circular sensoria; length of hind leg: femur .4 mm; tibia .52 mm.; tarsus .18 mm. Total length 2.4 mm."

FOOD PLANT. Sea Worm-wood (*Artemisia maritima*).

LOCALITIES. Fleetwood (Walker) in October; Putney Common (Donisthorpe).

Related to but apparently distinct from *stellaris*.

Genus TOXOPTERA Koch.

*Ceylonia* Buckton.

Koch, Die Pflanzen., Aphid., 253 (1857); Buckton, Ind. Mus. Notes, II., 35 (1891); Baker, Bull. 826, U.S. Dep. Agri., 51 (1920); Theobald, Bull. Ent. Res., VII., pt. IV., 339 (1917).

Head without antennal tubercles, but with a median process. Antennæ of 6 segments and in the alate female with circular sensoria. Cornicles cylindrical, of moderate length, somewhat tapering to apices. Cauda much as in *Aphis*, is most constricted near base. *Fore wings with media once-branched*; hind wings normal. Males alate, with many sensoria on antennal segments iii. to v. Oviparous females apterous.

This genus was founded by Koch on his *aurantiæ*, a common Citrus pest. Buckton's genus *Ceylonia* was made for his *theæcola*, which is a typical *Toxoptera* and is the same as *Aphis coffeæ* of Nietner and the Cocoa Aphid *Toxoptera theobromæ* of Schouteden (vide Theobald, Bull. Ent. Res., VII., pt. IV., 339, 1917). The genus *Ceylonia* has certainly to sink under *Toxoptera*. Two species occur in Great Britain.

(i.) *Toxoptera graminum* Rondani.

(ii.) *Toxoptera typhæ* Laing.

It may be pointed out that *Aphis parietaria* Theobald has frequently *Toxoptera* venation and so persistent was it in the first colonies I found that I originally placed it in this genus, but as in most years and most colonies the venation is typical of *Aphis* I have placed it there.

#### TOXOPTERA GRAMINUM Rondani.

##### *Aphis graminum* Rondani.

Rondani, Nuovi. Ann. Soc. Nat. Bologna, Se. 2, viii., ix. (1847); and Se. 3, VI., (2) 9-12 (1852); Mazzanti, Nuovi. Ann. Soc. Nat. Bolog. (3), VI., 342-352 (1852); Passerini, Bull. Soc. Ent., Ital., III., 151, 248, 340, 343 (1860); Aphid., Ital., 28 (1863); Horvath, Rovartani Lapok, I., 143-145 (1884); Webster and Phillips, Bull. 110, Bull. Ent. U.S. Dep. Agri. (1912); Sajo, Zeits. f. Pflanzenk., IV., 4 (1894); Horvath, Fn. Reg. Hungariæ, 60 (1897); Del Guercio, Nuove Rel. R. Staz. Ent. Agraria, Firenze (1) II., 145 (1890); Pergande, Bull. 38, U.S. Dep. Agri., 7-19, pl. 1 (1902); Theobald, Bull. Ent. Res., IV., 333, fig. 14 (1914) and VI., pt. 2, 153 (1915); Theobald, Bull. II., S.E.A.C. Bull. 2, Res. Dept., 16 (1923); Das, Aphid., Lahore, Mem. Ind. Mus., IV., 196 (1918); Hall, Aphid. Egypt, 34 (1926); Willcocks, Insect and Related Pests of Egypt, II., 104-106, 110-112, 352-353 (1925).

*Alate viviparous female.* Abdomen yellowish-green to green; head and thorax dark, the former yellow-brown to deep brown; latter black; sternal plate black. Eyes brown. Antennæ black except at base which is yellow to yellowish-green. Legs yellowish; femora dusky except at base; posterior femora darkest; apices of tibiæ and the tarsi black. Cornicles cylindrical, yellowish-green to almost yellow. Cauda yellowish to dusky, in some pale at base, apices almost black. Anal plate yellow or dusky. Head somewhat raised in middle and to some extent at sides. Antennæ of 6 segments, as long as or a little shorter than body; i. larger than ii.; iii. longer than iv. but not nearly so long as vi., with 4 to 7 round sensoria; iv. and v. about equal; now and then iv. has a single secondary sensorium; vi. longer than iv. + v., the flagellum three to three and a half times as long as base. Cauda rather long, constricted near middle, with two hairs each side and one dorso-apical; projecting well beyond cornicles.

Cornicles about as long as antennal segment iii.; faintly imbricate. Costa and sub-costal veins yellow; stigma grey to yellowish-grey; veins dark; third discoidal with one fork only.

Length 1.4 to 2 mm.

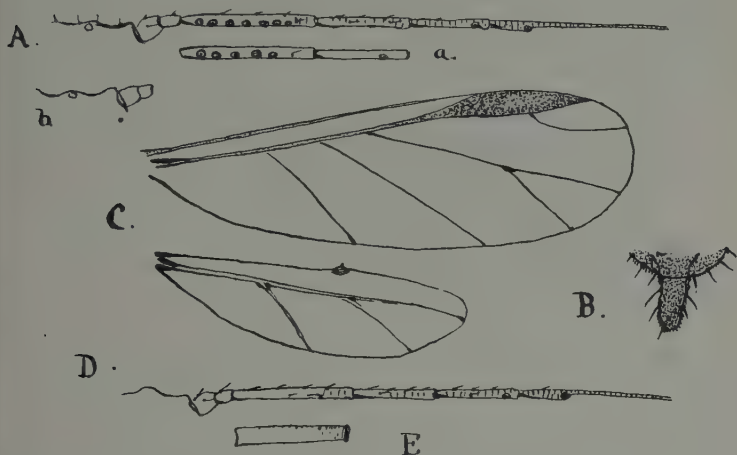


Fig. 147.—*Toxoptera graminum* Rondani.

A. Head and antenna of alate ♀; a, variation of antennal segment 3; b, variation of head. B. Cauda and anal plate; C. Wings. D. Apterous ♀ antenna; E. Cornicle of apterous ♀.

*Apterous viviparous female.* Pale green to yellowish-green, in some with a median dark dorsal line; to some extent pruinose. Antennæ dark, except at base, where they are yellow to yellowish-green. Legs yellowish-green; tibiæ dark at apices; tarsi dark. Cauda dusky-green to pale green. Cornicles green, cylindrical, but to some extent tapering to apices. Cauda constricted about the middle. Pronotum and abdomen with small lateral tubercles. Segment i. of antennæ larger than ii.; iii. longer than iv. and shorter than vi.; iv. and v. about equal; vi. with basal area a little more than one-third of the flagellum. Cornicles about as long as antennal segment iii.

Length 1 to 1.9 mm.

*Male.* Alate. Yellowish-green; head pale brownish to brownish-yellow; thoracic lobes and scutellum brown. Antennæ deep brown to almost black, segments i. and ii. pale yellowish green to green and in some the basal half of iii. Eyes black.

Venter of thorax dark. Legs pale yellowish-green to yellow; femora dusky, except at base; apices of tibiæ and tarsi dark. Cornicles yellow or green, apices dark. Cauda pale ochreous to

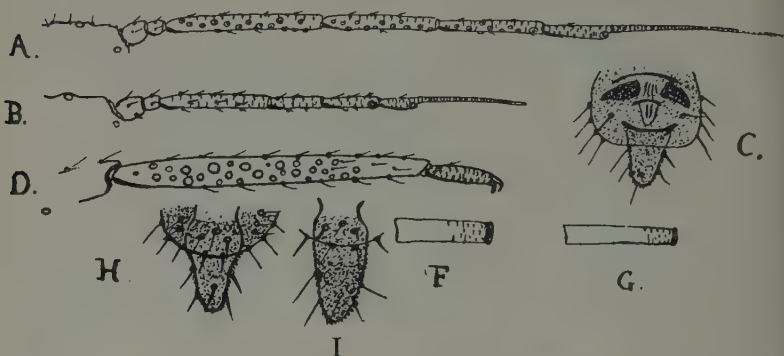


Fig. 148.—*Toxoptera graminum* Rondani.

A. Head and antenna of ♂; B. of oviparous ♀; C. Male genitalia and cauda; H. I. Cauda of ♂ and oviparous ♀; F. and G. Cornicles.

pale yellowish-green. Head rather flattened in front, with a few hairs; segment i. larger than ii.; iii. longer than iv., but not so long as vi.; many sensoria on iii. to v; iv. and v. about equal; vi. about as long as iv. + v.; flagellum long. Cauda rather long, about as long as cornicles, rather narrow and constricted near base. Penis small; claspers small and dark. Costa and subcosta yellowish; stigma pale; veins black. Sensoria on iii. of antennæ 17 to 20; on iv. 12 to 18, on v. 7 to 11 + 1. Traces of small lateral body tubercles.

*Length* 1.2 to 1.5 mm.

*Oviparous female.* Apterous. Pale yellowish-green, dusky-yellow tinged with green to deep green; some show a pruinose coating; there is usually a darker median line and the front of the body may be paler than the rest. Eyes black. Antennæ deep brown to black, except segments i. and ii. and basal half of iii., which are much the same colour as the body. Legs yellow to green; tibiæ brownish at apices; tarsi dark; hind tibiæ swollen, with many sensoria and scattered hairs on the legs. Cornicles green to ochreous, apices darkened, very slightly tapering and not reaching end of body. Cauda rather slender, constricted

towards base and not quite so long to nearly as long as the cornicles; with a few hairs. Small lateral abdominal tubercles.

*Length* 2 to 2.3 mm.

FOOD PLANTS. Barley, Oats, Maize, Wheat, Spelt, Rye; *Triticum repens*; *Avena barbata*; *A. elatior*; *Bromus erectus*; *B. villosus (maximus)*; *B. mollis*; *Cynodon dactylon*; *Dactylis glomerata*; *Fagopyrum esculentum*; *Hordeum murinum*; *Lolium perenne*; *Poa annua*; *Triticum villosum*; *Agrostis sp.*; *Cyperus rotundus* and *C. niveus* (Das).

Many others are recorded from America, etc.

LOCALITIES. Chilham, vii. 20 (F.V.T.); Inveran, N.B. x. 20 (D. Jackson). Italy; Hungary; Belgium; Africa; Njoro. II., 12 (Anderson). Egypt (Willcocks); Canada, United States and Mexico, India (Das).

*Observations.* This well known Aphid has twice been found in Great Britain, in both instances on grasses. In America it is a well known pest to corn, etc., and is spoken of as the "Green Bug" or "Spring Grain Aphis." It is also very harmful in Africa (Anderson, Rept. Dep. Agri. Brit. E. Africa, 1911-1912, 115, and Theobald, Bull. Ent. Res., IV., 333, 1914). It is subject to much variation in size and colour and the number of antennal sensoria. It is attacked by a number of parasites in America. A full account of this species has been issued by F. M. Webster and J. Phillips (1912) to which the reader is referred for fuller information. Das records it from the Punjab in India, where it attacks wheat, oats and barley.

#### TOXOPTERA TYPHÆ Laing.

Ent. Mo. Mag., LIX., 3rd Se., IX., 241, fig. 2, E.F. (1923).

"*Apterous viviparous female.* General colour bronzy-brown. Antennæ, cornicles, the mid and hind femora, and the apices of the tibiæ very dark brown to black. Proportion of antennal segments, 6, 5, 20, 12, 12 (6 + 27); total length 1.8 mm. Rostrum reaching to just beyond the mid coxæ. Prothorax with a strongly developed lateral papilla. Cornicles tapering gradually to apex, of the same length as segment iii. of the antennæ. Cauda short, approximately half the length of the

cornicles, sub-conical. The body and legs with very long fine hairs, those on the body on strong bases. Total length 2.3 mm.

*Alate viviparous female.* Of the same general colour as the apterous ♀. Proportions of antennal segments 6, 5, 23, 15, 14, (6 + 31); total length 1.9 mm.; segment iii. with from 8-14 circular sensoria lined along the apical  $\frac{3}{4}$ ; iv. with from 0-2. Rostrum reaching half-way between the front and mid coxæ. Cornicles slightly tapering, widely flanged at the mouth, equal in length to segment iv. of the antennæ. Cauda ensiform, short, about  $\frac{2}{3}$  the length of cornicles. Antennæ, body and legs with many fine long hairs as in the apterous ♀. Total length 2.2 mm.

On *Typha latifolia* Tottenham Waterworks, iv. 21 (C. L. Withycombe); Burnage Lane, Lancs., ix. 19 (H. Britten) " (Laing).

#### Genus CRYPTOSIPHUM Buckton.

Buckton, Mono. Brit. Aphid., II., 144 (1877); Baker, Bull. 826, U.S. Dept. Agri., 46, pl. VI., figs. PP, QQ (1920).

Cornicles very small, sub-cylindrical, not as long as wide, often appearing as mere pores as in *Pemphigus*. Cauda very small, but well shown in alatae. Vertex convex. Antennæ very short in apterous female, a little more than quarter length of body; longer in alatae, about half length of body. Flagellum about one and a half times length of basal area; Rostrum reaches beyond or to the second coxæ. Wings short, rounded, veined like *Aphis*. Legs rather short in the apterae, moderately long in the alatae.

Baker gives the following characters:—"Head without distinct antennal tubercles. Antennæ of 6 segments, rather short and with sub-circular sensoria. Fore wings with media either once or twice branched. Hind wings with both media and cubitus. Cornicles sub-cylindrical, but extremely short, not so long as wide. Cauda very short and rounded, not *Aphis* like; anal plate rounded."

One species only is known in this genus, namely *Cryptosiphum artemisiae* of Buckton=*gallarum* of Kaltenbach. The genus comes very near to *Neocaudus* gen. nov.



## CRYPTOSIPHUM GALLARUM Kaltenbach.

*Aphis gallarum* Kaltenbach.*Aphis artemisiæ* Passerini.*Cryptosiphum artemisiæ* Buckton.*Pseudolachnus yomogi* Shinji.

Kaltenbach, Verb. Nat. V. Preuss. Rhein West, 206 (1856); Die Pflanz-feinde, 359 (1872); Die deutsch. Phyto. a.d. Kl. d. Ins. (1874); Passerini, Gli Afidi, 35 (1860); Aphid, Ital. (1863); Buckton, Mono. Brit. Aphid, II., 145 (1877); Schouteden, Mem. Soc. Ent. Belg., XII., 215 (1906); Shinji, Dobuts. Zass., XXXIV., 406, 730 (1922).

*“Alate viviparous female.* Sooty grey, with mealy covering; small. Antennæ about half length of body, remote at bases; segment iii. obscurely ringed; flagellum rather longer than basal area of vi. Rostrum reaches to second coxæ. Cornicles very small, very slightly projecting or as mere pores. Cauda small. Legs stout and robust. Wings short and rounded at their tips; fuscous grey, finely punctured and non-iridescent, membrane rather wrinkled; insertions ochreous; stigma greyish; veins blackish.

*Length* 1.32 mm.; *expanse of wings* 4.06 mm.

*Apterous viviparous female.* Greyish-black to dull brown, very mealy. Oval. Much domed and carinated, coarsely ringed. Eyes reddish. Head small, vertex hairy. Antennæ short, flagellum of vi. about as long to one and a half as long as basal area. Legs very short, almost concealed when the insect is at rest. Apical part of body hirsute. Cornicles very small, almost pores. Cauda very small.

*Length* 1.64 mm.

*Pupa.* Smooth and shining, but a little mealy. Thorax and wing-cases rather ochreous, sometimes tipped with olive-green.”

**FOOD PLANT.** Mugwort (*Artemisia vulgaris*).

**LOCALITIES.** Brandon, Norfolk, viii. (Buckton); Sidmouth, 7 viii. 84 (F.V.T.); Newton Abbot, Southend-on-Sea (Laing); Lymm, Cheshire, ix. (Fryer). Italy (Passerini); Belgium (Schouteden); Germany (Kaltenbach); Taihoku Formosa, 26 vi. 21 and Kyoto, Japan, vi. 23 (Takahashi).

*Observations.* This aphid punctures the leaves of the Mugwort and distorts them, forming bunch-like galls of a red or bright yellow colour. As Buckton describes these galled masses, they might be taken to be the inflorescences of the plants at a distance. The insects swarm in the galled masses, partly lined by the natural fine pubescence of the leaves and partly by their mealy secretions. Alatae and apterae were sent to Buckton in August. I have only seen this species once and the specimens sent me by Mr. Fryer were too old and shrivelled to make proper preparations of, hence I quote from Buckton. There is no doubt that the species described by Buckton is Kaltenbach's *Aphis gallarum*. Passerini pointed out (Aphid. Italicæ) that his *Aphis artemisiæ* was only Kaltenbach's *gallarum*.

Genus NEOACAUDUS gen. nov.

Van der Goot erected a genus *Acaudus* founded on *Aphis lychnidis*, Linnæus. This species being a typical *Anuraphis* the genus *Acaudus* has to sink as a synonym.

The characters for *Acaudus* given by Van der Goot apply to my species *bipapillata*, but not to his genotype, except in certain stages, hence a new name is proposed as above. The characters of *Neoacaudus* are as follows:—Head devoid of any prominent frontal tubercles. Cornicles cylindrical, moderately long. Cauda reduced to a broad, short, rounded structure, completely hidden under the anal plate and often both under the body. One species only occurs *N. bipapillata* Theobald.

NEOACAUDUS BIPAPILLATA Theobald.

*Acaudus bipapillata* Theobald.

Scottish Naturalist, No. 133-134, 20 (1923).

*Apterous viviparous female.* Body oval. Antennæ short, a little more than quarter the length of body, of 6 segments; iii., iv. and v. much the same length; vi. much longer than iv + v., basal area about as long as v.; flagellum nearly twice as long as base. Eyes moderate. Rostrum reaching to second coxæ. Cornicles short, thick, cylindrical, slightly expanding basally, about as long, but much wider than segment iii. Cauda and anal plate rounded, both hidden under the body. Apex of abdomen with two small papillæ and a few hairs, which are also

present on the head. Legs rather stumpy; tibiæ with hairs, some longer than others on hind pair.

*Length* 1.2 mm.

*LOCALITY.* Swordale, Ross-shire, 23 viii. 22 (D. Jackson).

*FOOD PLANT.* Potato.

*Observations.* Described from a single perfect specimen mounted in balsam. It is very distinct and can at once be told by the two small papillæ at the apex of the abdomen.

*Type* in Miss Jackson's collection.

### Tribe CALLIPTERINI.

This tribe is distinguished from others of the Sub-family Aphidinae by the cornicles being either truncate or rarely elongate; when elongate the cauda is knobbed and the anal plate bilobed or the antennæ are markedly hirsute. Body usually small and delicate and often adorned. Many forms are armed with capitate hairs, arising from distinct tubercles. The frons seldom has any trace of tubercles. Antennæ vary in length and may or may not be hairy, they are usually as long as or longer than the body, but may be shorter and composed of 6 segments, the flagellum very variable in length, but seldom shorter than basal area; they are provided with few sensoria, which may be circular, oval or elongate oval. The cornicles vary to a great extent; in *Drepanosiphum* they are long, in most (*Myzocallis*, *Callipterus*, *Therioaphis*) they are short, truncate and unadorned, whilst in *Chaitophorus* they may be sculptured; they may even be reduced to mere rings (*Phyllaphis*). The cauda is usually knobbed and the anal plate bilobed (*Therioaphis*, etc.) or both may be rounded (*Symydobius*), whilst in the *Saltusaphidina* the plate is quite divided, but the cauda remains knobbed. The wings are usually normal and in many markings are present along the veins, at their ends and on the membrane; the radial sector may be absent in some species. They mainly occur on the leaves of deciduous trees, a few on herbs (*Therioaphis ononidis* Kalt. and the *Saltusaphids*). Wax secretion is present to any extent in a few only, notably *Phyllaphis*. In habits they vary very much, some are sedentary (*Chaitophorus*; *Myzocallis*), others active (*Euceraaphis*; *Symydobius*) and some of the *Saltusaphidina* can leap. The sexual forms may

be alate or apterous; the males usually are alate, but in the *Saltusaphidina* they are apterous and occasionally in the *Chaitophorina*. Many ova are often laid by one female. As far as I have traced in this country there are no alternate host plants; the whole life-cycle being passed on the same kind of tree or herb. It is possible that this is not so however with *Callipterus juglandis*. The *Pterocommina* and *Chaitophorina* produce much honey dew and are largely attended by ants in consequence.

#### SUB-TRIBES OF CALLIPTERINI.

- |  |                         |
|--|-------------------------|
| 1. Eyes with ocular tubercles present, head not elongate.        | 2.                      |
| Eyes without ocular tubercles.                                   | <i>Saltusaphidina</i> . |
| 2. Antennæ armed with rather long prominent hairs.               | 3.                      |
| Antennæ with minute or stout bristles.                           | 5.                      |
| 3. Cornicles present.  | 4.                      |
| 4. Cornicles vasiform or cylindric.                              | <i>Pterocommina</i> .   |
| Cornicles truncate, enlarged at base.                            | <i>Chaitophorina</i> .  |
| 5. Cornicles absent.   | <i>Monaphidina</i> .    |
| Cornicles present, position as usual.                            | 6.                      |
| 6. Cornicles mere rings, large abdominal wax plates.             | <i>Phyllaphidina</i> .  |
| Cornicles usually not reduced to rings, no abdominal wax plates. | 7.                      |
| 7. Cornicles variable, usually long and swollen.                 | <i>Drepanosiphina</i> . |
| Cornicles short and truncate.                                    | <i>Callipterina</i> .   |

#### Sub-tribe CALLIPTERINA.

Cornicles short, but always present, truncate, some with hairs. Antennæ of 6 segments, long or moderately long, with short hairs or spines, never long, numerous hairs; sensoria either circular or elongate-oval. Cauda usually knobbed; anal plate bilobed or indented. Body often with capitate hairs or tubercles. Wings with usually normal venation and often ornamented with darker bands or clouding. The males are usually alate; oviparous females apterous.

These insects live on the foliage of trees and shrubs and a few on herbs. They often appear in great numbers, but only a few occasion any damage. The Lime Tree Callipterid—*Therioaphis tiliæ* (Linnæus) often produces so much honey dew that the leaves

are killed. The Fragile Nut Aphid *Myzocallis coryli* Goetze also now and then causes appreciable damage in nut plantations. Some species are almost world wide, such as *Therioaphis ononidis* Kaltenbach. Many of the species are more or less solitary, but some of the *Myzocallis* and *Callipterus* live in fair sized colonies.

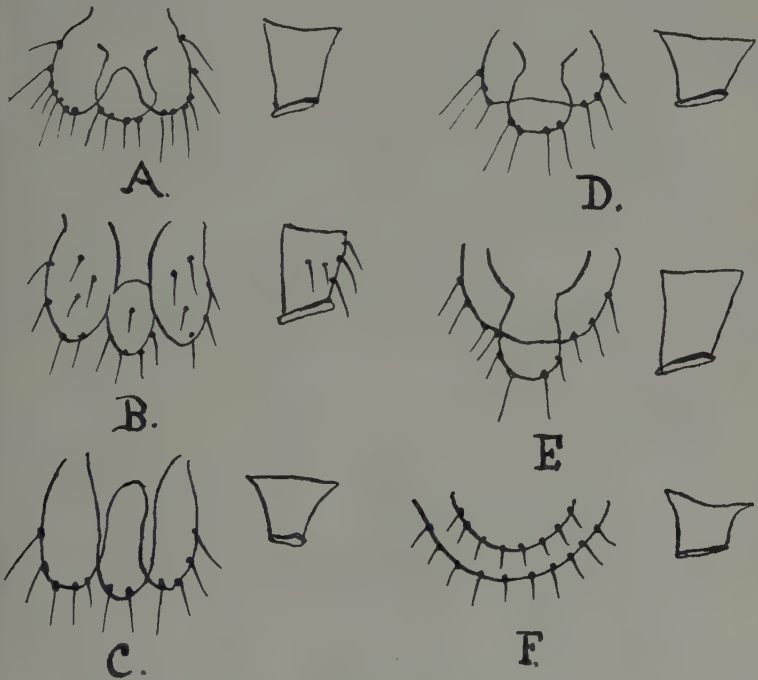


Fig. 149.—Cauda, Anal Plate and Cornicles of Callipterina.

A. *Myzocallis*; B. *Callipterus*; C. *Therioaphis*; D. *Chromaphis*;  
E. *Euceraphis*; F. *Symydobius*.

The accepted genera tabulate as follows :—

- |  |                            |
|--|----------------------------|
| 1. Anal plate bilobed or deeply cleft ; cauda knobbed. | 3.                         |
| Anal plate entire.                                     | 2.                         |
| 2. Cauda knobbed ; antennæ setose.                     | <i>Euceraphis</i> .        |
| Cauda not knobbed antennæ minutely setose.             |                            |
| Cephalic and body hairs short.                         | <i>Symydobius</i> .        |
| Cephalic and body hairs long.                          | <i>Chaitocallipterus</i> . |

3. Anal plate very deeply divided, lobes apparently distinct;  
cauda knobbed. *Therioaphis.*  
Anal plate bilobed, not deeply divided; cauda strongly  
knobbed. 4.
4. Antennæ and often cornicles with prominent hairs.  
*Callipterus.*  
Antennæ and cornicles without hairs. 5.
5. Cornicles much reduced. *Monellia.*  
Cornicles truncate, fairly well developed. 6.
6. More or less distinct antennal tubercles present. *Calaphis.*  
No distinct antennal tubercles. 7.
7. Anal plate slightly indented or almost entire; no apterous  
viviparous forms present. *Chromaphis.*  
Anal plate distinctly bilobed; apterous viviparous females  
present. *Myzocallis.*  
The following genera occur in Great Britain:—*Euceraphis*,  
*Symydobius*, *Therioaphis*, *Callipterus*, *Calaphis*, *Chromaphis* and  
*Myzocallis*.

## LIST OF BRITISH SPECIES.

- Myzocallis coryli* Goetze.  
 „ *alni* Fabricius.  
 „ *castanicola* Baker.  
 „ *arundicolens* Clarke.  
 „ *arundinariæ* Essig.  
 „ *myricæ* Kaltenbach.  
 „ *annulata* Hartig.  
 „ *querceus* Kaltenbach.  
*Chromaphis juglandicola* Kaltenbach.  
*Callipterus juglandis* Frisch.  
*Therioaphis ononidis* Kaltenbach.  
 „ *tiliæ* Linnæus.  
 „ *betulicola* Kaltenbach.  
*Euceraphis betulæ* Linnæus.  
*Symydobius oblongus* Heyden.  
*Calaphis annulatus* Koch.

FOOD PLANTS OF *Callipterina*.

- |                            |                       |
|----------------------------|-----------------------|
| <i>Acer pseudoplatanus</i> | <i>T. tiliæ</i> Linn. |
| <i>Alnus glutinosa</i>     | <i>M. alni</i> Fabr.  |



<i>Arundinaria</i>	<i>M. arundicolens</i> Clk.
„	<i>M. arundinariæ</i> Essig.
<i>Arundo donax</i>	<i>M. arundicolens</i> Clk.
„	<i>M. arundinariæ</i> Essig.
<i>Bambusa</i> spp.	<i>M. arundicolens</i> Clk.
„	<i>M. arundinariæ</i> Essig.
<i>Betula</i> spp.	<i>T. betulicola</i> Kalt.
„	<i>S. oblongus</i> Hey.
„	<i>E. betulæ</i> Linn.
„ <i>pubescens</i>	<i>C. annulatus</i> Koch.
<i>Carpinus betulus</i>	<i>M. alni</i> Fabr.
<i>Castanea pumilo</i>	<i>M. castanicola</i> Baker.
„ <i>vesca</i>	<i>M. annulata</i> Hart.
<i>Corylus avellana</i>	<i>M. coryli</i> Goetze.
„	<i>T. tiliæ</i> Linn.
<i>Epilobium</i> sp.	<i>M. alni</i> Fabr.
<i>Juglans</i> spp.	<i>C. juglandicola</i> Kalt.
„	<i>C. juglandis</i> Frisch.
<i>Medicago sativa</i>	<i>T. ononidis</i> Kalt.
<i>Myrica gale</i>	<i>M. myricæ</i> Kalt.
<i>Ononis spinosus</i>	<i>T. ononidis</i> Kalt.
<i>Phyllostachys</i>	<i>M. arundicolens</i> Clk.
<i>Quercus</i> spp.	<i>M. annulata</i> Hartig.
„	<i>M. querceus</i> Kalt.
„	<i>M. castanicola</i> Baker.
<i>Sasa paniculata</i>	<i>M. arundicolens</i> Clk.
<i>Solanum tuberosum</i>	<i>M. coryli</i> Goetze.
<i>Tilia americana</i>	<i>T. tiliæ</i> Linn.
„ <i>cordata</i>	<i>T. tiliæ</i> Linn.
„ <i>glandifolia</i>	<i>T. tiliæ</i> Linn.
„ <i>platyphylla</i>	<i>T. tiliæ</i> Linn.
„ <i>rubra</i>	<i>T. tiliæ</i> Linn.
„ <i>vulgaris</i>	<i>T. tiliæ</i> Linn.
<i>Trifolium alexandrinum</i>	<i>T. ononidis</i> Kalt.
„ <i>pratense</i>	<i>T. ononidis</i> Kalt.
<i>Thymus aquaticus</i>	<i>M. alni</i> Fabr.

Genus MYZOCALLIS Passerini.

*Pterocallis* Passerini.

*Subcallipterus* Mordwilko.

*Tuberculatus* Mordwilko.  
*Callipterus* Van der Goot.  
*Tuberculoides* Van der Goot.  
*Acanthocallis* Matsumura.  
*Takecallis* Matsumura.  
*Agrioaphis* Walk.

Passerini, Gli Afidi, 28 (1860); Mordwilko, Varshava Univ. Izviestii, 8, no. 58, 63 (1894); and 60 (1894); Wilson, Canad. Ent. XLII., 253, 259 (1910) and 384-388 (1910); Essig, Pom. Journ. Ent., VI., 3, 761 (1912); Van der Goot, Tijds. v. Ent., 56, 116 (1913); Van der Goot, Beitrage z. Kennt. d. Holl. Blattläuse, 313 (1915); Matsumura, Journ. Coll. Agri. Tohoku Univ., 7, pt. 6, 368 and 373 (1917); Baker, Bull. 826, U.S. Dept. Agr. 29 (1920).

Fragile species with stout truncated cornicles, without any marked neck and no hairs. Antennæ moderately long, of 6 segments, with a few small hairs, with circular sensoria. Cauda knobbed. Anal plate strongly bilobed, but never divided. Wings normal. Body usually with rather stout hairs.

*Type of the genus coryli* Goetze. Passerini erected the genus *Myzocallis* with *coryli* as type, on the same page he erected the genus *Pterocallis*, with *alni* as type, both are as closely related as can be and thus the latter genus must sink. Van der Goot by some error made *coryli* the type of *Callipterus*; in 1860 Passerini set *juglandis* Frisch as the type, thus Van der Goot's *Callipterus* must sink. Mordwilko used *alni* as the type of *Subcallipterus*, which was Passerini's type of *Pterocallis*. *Quercus* (Kaltenbach) is certainly a *Myzocallis* also and there is no valid reason for Van der Goot's *Tuberculoides*. Nor can I see any reason for placing *bambusæ* (that is *arundicolens*) in a new genus *Takecallis*, for the species, which occurs in Britain, is so closely related to *coryli* that it must be placed in the same genus as that insect. Mordwilko's *Tuberculatus* can only be separated by the curious tubercles on the body.

MYZOCALLIS CORYLI Goetze.

*Aphis coryli* Goetze.  
*Corylaphis* Amyot.  
*Callipterus coryli* Koch.  
*Callipterus carpini* Koch.\*

\* Buckton's *carpini* is not this insect, but *E. betulæ*.

Goetze, Ent. Beitrage, II., 311 (1778); Gmelin, Ed. Syst. Nat., I., 4, 2210, 69; Kaltenbach, Mono. Pflanz., I., 98, 73 (1843); Amyot, Ann. Soc. Ent. Fr. 2<sup>me</sup> Se. V., 479 (1841); Walker, Ann. Nat. Hist., Se. 2, I., 336, 11 (1848); Koch, Die Pflanz., 215, 5, pl. XXX, figs. 287 and 216, 6, fig. 288 (1855); Walker, List. Homop. (B.M.), IV., 942, 11 (1852); Passerini, Aphid. Ital., 54, 4 (1863); Davis, Journ. Eco. Ent., III., 417 (1910); Essig, Pom. Journ. Ent., IV., 762 (1912); Swain, Univ. Cali. Publ. Ent., III., 25, figs. 43, 44; 53 and 54 (1919).

*Alate viviparous female.* Very pale yellow to yellow. Eyes dark red. Vertex prominent. Antennæ yellow, in some almost transparent, apices dusky, as long as body; segment i. a little longer than ii.; iii. longest, with 3 to 6 round sensoria near base; iv. longer than v., flagellum of vi. a little longer than basal area, imbricate, as is also apex of v. Cephalic hairs capitate.

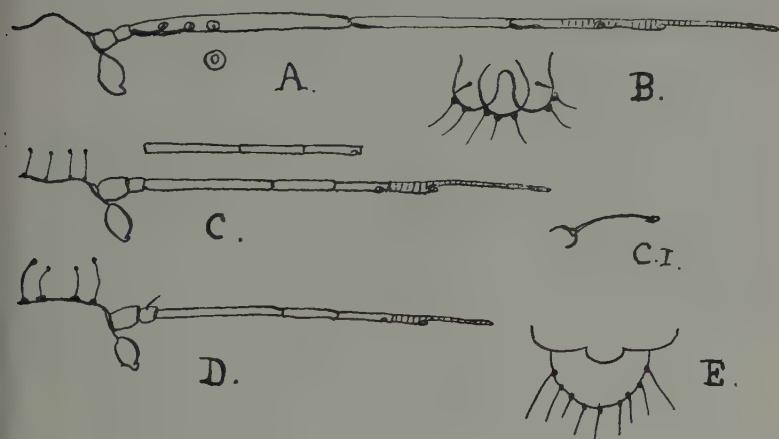


Fig. 150.—*Myzocallis coryli* Goetze.

A. Alate ♀ antenna; B. Cauda and anal plate; C. Apterous ♀; C.I. hair; D. Head and antenna of oviparous ♀; E. Cauda.

Cornicles small, pale yellow. Legs yellow, rather short, apices of tibiae and tarsi dusky; tibiae with fine hairs. Veins, stigma and insertions pale yellowish-green. Rostrum pale yellow, apex slightly dusky, rather thick, reaching to third coxae. Cauda pallid, markedly knobbed. Anal plate bilobed, pallid, bristly,

also cauda. In some specimens the apices of antennal segments iv. and v. dusky.

*Length* 1.4 to 1.6 mm.

*Apterous viviparous female.* Transparent yellow, pallid green or white, shiny; with many long capitate hairs all over body. Eyes large, deep reddish-black to red. Antennæ as long as body; transparent, with traces of dusky rings at apices of segments iv. and v.; vi. dusky on flagellum and about apex of basal area; iii. longer than iv.; iv. and v. about equal; vi. with flagellum about twice as long as basal area. Rostrum pallid, rather broad, reaching to about third coxæ. Cornicles, cauda and bilobed anal plate pallid. Legs almost transparent.

*Length* 1.4 to 1.7 mm.

*Oviparous female.* Pale yellow, except for dark eyes; apices of antennæ and tips of segments iii. to v. dusky. Head and body with long fine pale hairs, slightly capitate. Rostrum thick,

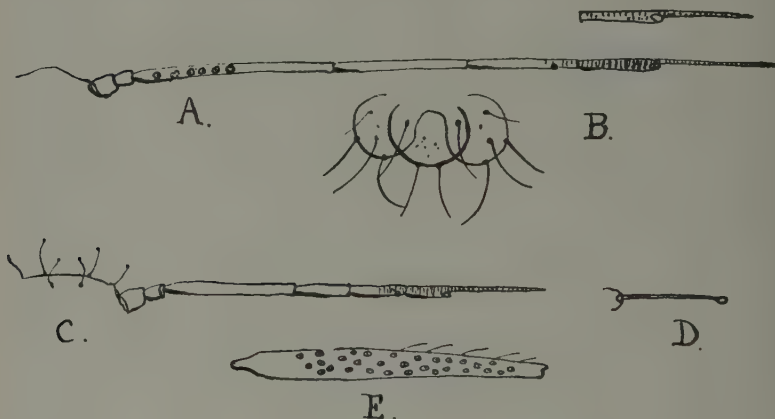


Fig. 151.—*Myzocallis coryli* Goetze.

A. Antenna of alate ♀; B. Cauda and anal plate; C. Head and antenna of oviparous ♀; D. Body hair; E. Hind tibia. (From *Carpinus*.)

reaching to second coxæ. Antennæ longer than body. Cauda and anal plate large and rounded, very hairy. Hind tibiæ swollen, but not showing sensoria.

*Length* 1 mm.

FOOD PLANTS. Nuts (*Corylus avellana*, etc.); Hornbeam (*Carpinus betulus*): Oaks (*Quercus spp.*).

LOCALITIES. Wye; Maidstone; Kingston-on-Thames; Hastings; Worcester; Hereford; Little Hadham; Exeter; Sidmouth; Salisbury; Ealing; York; Holmes Chapel; Oxford; Abingdon; Reading (F.V.T.); Wales on Potatoes, alate females (C. L. Walton), Sevenoaks, Swanley, Ruislip, Oxshott, Midhurst, New Forest, Lynmouth, Birmingham district, Halifax, on the Chilterns, throughout the North of Scotland, Argyllshire (F. Laing).

*Observations.* Often very abundant on both wild and cultivated nuts and hornbeam. In some years it is present in vast numbers and covers the foliage with sticky honey dew. The young may be found in May and it occurs on the trees until November when the sexuales appear. In 1913 I found the oviparous females ovipositing as late as November. This Aphid seems very partial to the suckers of the nut trees, but may also swarm under the top foliage. It is rarely, however, that they do much damage. The insect described by Koch as *Callipterus carpini* is certainly the same. I have examined numbers from both nuts and hornbeam, alatae and oviparae and can detect no difference of any importance between them, and find the sensoria on segment iii. of the alate antennae vary from 3 to 6. So far no natural enemy is known to keep it in check, but often *Chrysopid* larvæ occur. Coccinellids and Syrphids seldom seem to attack it.

MYZOCALLIS ALNI De Geer (non Essig.).

*Aphis alni* De Geer.

*Aphis alni* Fabricius.

*Aphis maculata* Heyden.

*Callipterus alni* Koch.

*Pterocallis alni* Passerini.

De Geer, Mem. d. Ins., III., 47 (1773); Fabricius, Ent. Syst., IV., 215 (1794); Syst. Rhyng., 298 (1794); Heyden, Mus. Senk., II., 297 (1837); Kaltenbach, Mono. Pflanz., 211 (1843); Koch, Monog. 211-212, fig. 284 (1855); Walker, Ann. Mag. N.H. (2) 1, 341-343 (1848); Passerini, Gli Afidi, 28 (1860); Buckton, Mono. Brit. Aphid, III., 31 (1880); Schouteden, Aphid. Belg., 210

(1906); Kirkaldy, *Canad. Ent. XLVII.*, 417 (1905); Davis, *Journ. Eco. Ent.*, III., 416 (1910)†; Essig., *Pomona, Coll. Journ. Ent.*, IV., 3, 764 (1912).\*

*Alate viviparous female.* Colour pale yellowish-green to bluish-green. Antennæ pale green, with dark rings. Cornicles small, deep green. Legs green; tarsi dusky. Wings moderate, costa and cubitus green; stigma grey and slender; veins slender, dusky-green, apices clouded. Antennæ as long as or longer than body; segment i. broader but scarcely longer than ii.; iii. much longer than iv.; iv. a little longer than v., vi. not so long as iv; nail shorter than basal area; apices of iii. to v. dusky or banded; vi. all dark; iii. with 3 to 5 round sensoria on basal half. Rostrum pale green, short and rather broad, apex dusky, reaching to or just beyond first coxæ. Cauda globate. Anal plate emarginate, with long hairs arising from well developed tubercles.

*Length* 1.6 to 1.8 mm.

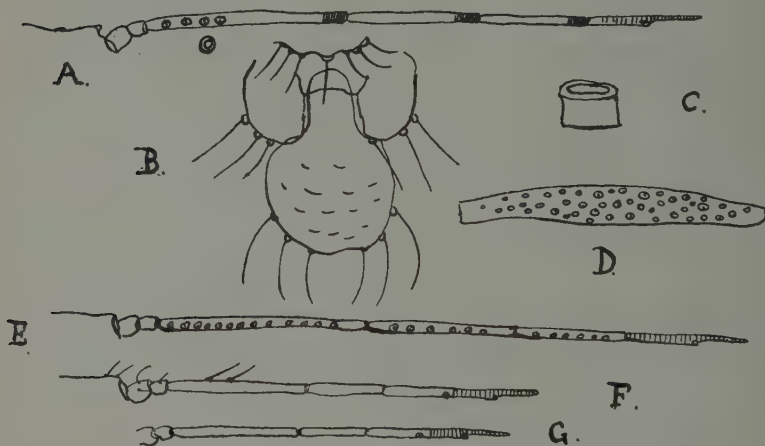


Fig. 152.—*Myzocallis alni* De Geer.

A. Antenna of alate ♀; B. Cauda and anal plate; C. Cornicle; E. Male antenna; D. and F., Oviparous ♀; D. Hind tibia; F. Antenna; G. Antenna of apterous viviparous ♀.

\* The *Myzocallis alni* of Essig is clearly not the European species (*vide* figures).

† Davis's record — *alnifoliae* Fitch (see Davis, *Canad. Ent.* 51, 234 (1919).



*Apterous viviparous female.* Pale green, many specimens show deep green to brown markings at the sides and often 1 or 2 broken dark areas across abdomen. Antennæ very pale green or white to almost translucent; apices of segments iii. to v. with dark bands. Cornicles green or just tipped with dusky hue, very small. Legs green, often quite transparent; tarsi dark. Abdomen with many hairs. Eyes brown. Antennal segment iii. much longer than iv., with 2 marked short hairs just below middle; iv. very little longer than v.; vi. about as long as v., "nail" about as long as basal area. Rostrum reaching past first coxæ, but not to second. Head and body hairs long, faintly capitate and arising from marked tubercles. Cauda globate. Anal plate emarginate, with many capitate hairs, pallid.

*Length* 2 to 2.3 mm.

*Oviparous female.* Green to yellow; pyriform; head and body with long slightly capitate hairs. Cornicles short, all dark or only at apices. Antennæ shorter than body; green to pale yellow, apices of segments iii. to v. dusky; vi. all dark; iii. much longer than iv.; iv. and v. about equal in length; vi. not quite so long as v.; "nail" shorter than base; iii. with 2 short hairs just below middle. Rostrum pale, apex dusky, reaching to first coxæ. Legs pale yellowish green; tarsi dusky; hind tibiæ much swollen and also the femora; the former with many large round sensoria. Cauda and anal plate green; hirsute, the former prominent.

*Length* 1 to 1.3 mm.

*Male.* Antennæ longer than body; segment i. as long as ii. with a slight inward projection which is darkened; iii. longer than iv., with 10 to 14 round sensoria, some small, along whole length one side; iv. with 5 to 7 round sensoria; v. with 5 to 6 sensoria and the usual primary one; iv. longer than v.; vi. about as long as v., flagellum shorter than basal area. Anal plate and genitalia dark. Body small. Head and thorax brown; body green. Cornicles small, broad, truncate, dark.

*Length* 1.2 mm.

FOOD PLANTS. *Alnus glutinosa* and *A. rhombifolia*; Oaks over Alders; Thyme and *Epilobium* both under Alders.

LOCALITIES. Wye; Hastings; Little Hadham; Bath; Wells; Abingdon; Lincoln; New Forest; Criccieth, North

Wales (F.V.T.); Windermere (Rymer Roberts); Great Salkeld (Britten); Haslemere and Edgeware (Buckton); Midhurst; Chess Valley; Kew Gardens; Birmingham; Halifax; Lynmouth; Bournemouth; Aberdeenshire; Argyllshire, &c. (F. Laing).

*Observations.* This insect seems to be generally distributed on Alders from May onwards and is generally common. Alate females appear in June and seem to me to fly only to other alders. The sexual forms occur in the autumn and the ova are laid at the base of the buds. It occurs in small numbers, never in dense colonies. Essig describes *M. alni*, but I feel convinced it is not the European *alni*, for he says the sensoria on antennal segment iii. are 4 to 6, all of which are more often confined to the apical half; they are always basal in true *alni*.

MYZOCALLIS CASTANICOLA Baker (nov. nom.).

*Callipterus castaneæ* Buckton (non Fitch).

*Tuberculatus castaneæ* Mordwilko.

*Myzocallis davidsoni* Swain.

Buckton, Mono. Brit. Aphid., III., 26, 28 (1880); Matsumura, Journ. Coll. Agri. Tohoku, Imp. Univ., VII., 6, 353 (1917); Baker, Journ. Eco. Ent., X., 420-433 (1917); Swain Trans. Ent. Soc., America, XLIV., 1-4, figs. 1, 15, 34, 35, 36 (1918); Schouteden, Mem. Soc. Ent. Belge, XII., 211 (1906).

*Alate viviparous female.* Pale yellow shades, some with pale green tinge, with brown squarish or elongate spots on abdomen; median pair elongate, the row on each side squarish; a dark line in middle of head; several dark median lines on pronotum and a dark prominent line on the three thoracic lobes; fore wings with clouding at apices of veins. Antennæ pale yellow to brown, apices of segments dark (when yellow); last segment mostly dark. Eyes red. Cornicles brown to almost black. Legs yellow; hairy, especially tibiæ; apices of femora and sometimes tibiæ dusky; tarsi dusky. Body tuberculate. Antennæ about as long as body; segment iii. with 4 to 8 round sensoria on basal area. Rostrum not reaching second coxæ. Cornicles short, about as long as cauda, truncate, cylindrical. Anal plate yellow, bilobed. Cauda deep yellow-brown to black, hairs long. Before cornicles 2 dark lateral prominent tubercles.

*Length* 1.3 to 1.5 mm.

*Apterous viviparous female.* Pale yellow to yellowish-green, some deep citron-yellow; rather flattened and ovate; pronotum with 2 median elongate lateral spots and a black spot each side, rest of thorax and abdomen with four rows of black spots, the median pair on abdomen laterally elongate. Antennæ shorter than body, greenish or yellow, apices of the segments dusky. Head with capitate hairs. Legs yellow or pale green; apices of femora and the tarsi dusky. Eyes black. Rostrum yellow or green, short, not reaching second coxæ. Cornicles short, green. Whole body with capitate hairs.

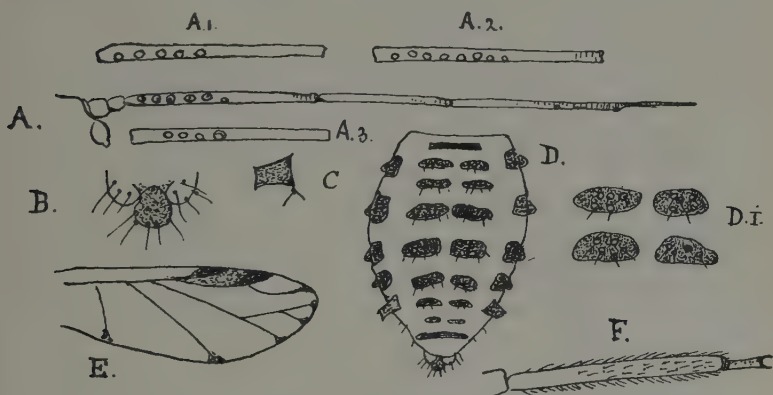


Fig. 153.—*Myzocallis castanicola* Baker.

A. Antenna of alate ♀; A1—A3, Varieties of Segment iii.; B. Cauda and anal plate; C. Cornicle; D. Body markings; D.I. Body glands; E. Wing; F. Hind tibia.

*Length* 1.5 to 1.8 mm.

*Oviparous female.* Apterous; very similar in form to the viviparous female, but the dark markings are usually more developed; body and head with capitate hairs, arising from prominent tubercles. Antennæ shorter than body, green; apices of segments iii. to v. black and all vi.; iii. twice as long as iv.; iv. and v. about equal; iii. a little longer than v.; "nail" a little longer than base. Rostrum pale, short, not reaching second coxæ. Cornicles green, short, rather thick and expanding basally. Ovipositor prominent. Anal plate dark,

not bilobed. Legs green, rather thick ; tarsi dark. Hind tibiæ much swollen, hirsute, with many round sensoria.

*Length* 1 to 1.3 mm.

*Male.* Alate. Green ; head ; meso- and meta-notum and mid region of abdomen dark. Head and thorax large ; abdomen small. Antennæ much longer than body, dark brownish-green ; round sensoria on segments iii. to v. ; iii. longer than iv., with many sensoria ; iv. a little longer than v., with 14 to 16 sensoria ; v. with 5 to 6. Cornicles short, thick, black. Genitalia dark, hirsute. Legs green to deep green, rather long and thick, especially hind pair. Wings very much longer than body.

*Length* 1.2 to 1.3 mm.

FOOD PLANTS. *Castanea vesca* ; *Castanea crenata* and Oaks (*Quercus* spp.).

LOCALITIES. Haslemere (Buckton) ; Wye, v. to x. ; Hothfield, 2 vi. 26 ; Godmersham, 9 vi. 11 ; Taplow ; Kingston-on-Thames (1887) ; Robertsbridge ; Ross ; Monmouth ; Brockenhurst on *Ilex*, 20 viii. 15 (F.V.T.) ; Windermere, 20 vi. 14 (Rymer Roberts) ; Sevenoaks ; Kew Gardens ; Richmond Park ; Midhurst (Laing) ; Japan (Matsumura) ; America ; New Zealand.

*Observations.* Described by Buckton from specimens found at Haslemere where it was plentiful in the copses of Sweet Chestnut from May to December. Mr. Laing says : " In Kew Gardens it occurs some years in vast swarms on the undersides of oaks with tough leaves, such as *Q. ilex*. In New Zealand, it occurs on both oak and chestnut, and threatens to become a pest." It is usually, more or less solitary in habits, usually one or two on a leaf, now and then as many as six. The sexual forms commence to appear in October and go on until December. The female lays her black ova in the axils of the buds and they are somewhat irregular in form, some being oval, others spindle shaped and some according to Buckton attenuated at one end and corrugated. The body markings are subject to much variation. Some oviparous females are almost all black and as Buckton points out, the later apterous viviparæ have the dark areas increasing and so make the whole insect of a dark hue.

Specimens sent me from the United States as Fitch's *castaneæ* which I have carefully examined *castanicola*. Baker and Swain say that Fitch's *castaneæ* is a *Calaphis*. I find it as equally common on Oaks as on Sweet Chestnut, where as is the usual custom, they are grown together. Even when very plentiful it does not seem to do any harm to the foliage.

MYZOCALLIS ARUNDICOLENS Clarke.

*Callipterus arundicolens* Clarke.

*Takecallis bambusæ* Matsumura.

Clarke, Canad. Ent., XXXV., 249 (1903); Davidson, Journ. Eco. Ent., II., 301 (1909), and III., 376 (1910); Essig, Pomona Journ. Ent., IV., 762 (1912) in part; Essig, Univ. Calif. Publi. Entomo., I., 305 (1917); Swain, Univ. Calif. Publi. Ent., III., No. 1, p. 22, figs. 22, 48, 51, 52 (1919); Matsumura, Journ. Coll. Agri. Tohoku. Imp. Univ., III., pt. 6, 373, pl. XVI., fig. 1, a.b.c.d. (1917); Theobald, Misc. Publi., No. 32, Ministry of Agri. (1921); Laing, Ent. Mo. Mag., IX., 3rd Se., 244 (1923).

*Alate viviparous female*. Pale yellow. Head pale yellow; eyes red. Cornicles pale. Cauda jet black. Anal plate pallid. Wings hyaline, dusky at apices of veins; first and second discoidals and base of stigma darkened. Antennæ longer than body; pale, except segments i. and ii., which may be all dusky

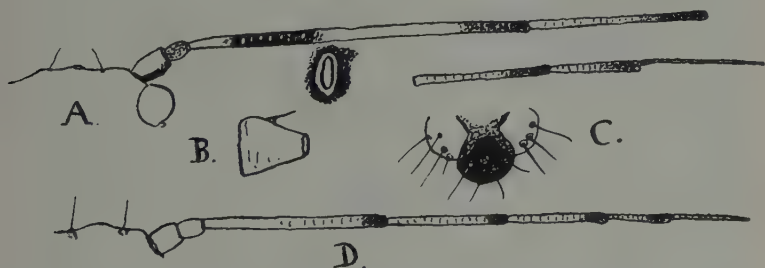


Fig. 154.—*Myzocallis arundicolens* Clarke.

A, B, C. Alate ♀, Antenna, Cornicle and Cauda; D. Antenna of nymph.

at apices; apices of iii. to v. dark and a broad dark band on basal half of iii.; vi. dusky, mainly so in middle and apex; i. larger than ii., most specimens show a dark area on one side; iii. long,

much longer than iv., dark area on basal half with 5 to 8 oval sensoria; iv. slightly longer than v.; vi. much longer than v.; flagellum about as long as basal area. A few hairs on head. Rostrum pale, rather thick, short, only reaching to first coxæ. Anal plate deeply bilobed, hairy. Cauda knobbed, with many long hairs, its jet black colour showing up prominently. Cornicles short, broadened at base, with one marked thick pale hair on one side. Legs delicate, pale, apices of tibiæ dusky; tarsi dusky.

*Length* 1.3 to 2.2 mm.

*Nymph.* Pale yellow; apices of antennal segments iii. to v. black; vi. dusky. Wing pads pale yellow.

*Length* 1.4 to 1.7 mm.

**FOOD PLANTS.** Various Bamboos, especially *Bambusa*, *Arundinaria*, *Phyllostachys*, *Arundo donax*; *Sasa paniculata* (Matsumura).

**LOCALITIES.** Truro, 29 iii. 20 (Green); Torquay (Laing); Ermington, South Devon, 18 viii. 25 (Hodgson); Camberley, 17 x. 20; Wisley, 10 x. 20; Bramley, Surrey; Wye, 10 ix. 20 (F.V.T.); Tokyo, Japan (Takahashi and Matsumura); America (Essig, Swain, Clarke, etc.).

*Observations.* Specimens were first sent me by Mr. E. E. Green from Truro, where he found it in abundance in some old established Bamboo thickets and later from Camberley. It also has occurred in abundance on bamboos at Wisley and I found some small colonies on a Bamboo in my garden at Wye. Essig mixed up this species with another found with it and which he named *arundinariæ* (Univ. Calif. Publi. Ent., I., 302, 1917). Matsumura placed this species in a new genus *Takecallis*, but I see no reason to separate off this genus. His name *bambusæ* has to sink as it is the same species as described by Clarke from America. The mounted specimen sent me by Essig and others from America as *arundicolens* are totally distinct. The old *arundicolens* of Essig is certainly not the species described by Clarke. This second species has been named by Essig *arundinariæ* (vide Essig, Univ. Calif. Pub. Ent., I., 302-305, 1917, and Swain, Univ. Calif. Publi. Tech. Bull. Coll. Agri. Exp. Sta., Entomo., III., I., 24, pl. 3, figs. 48, 51 and 52 (1917). There is no doubt that the species referred to by Swain is the same as the insect described here and



identified by me from Japanese specimens as *Takecallis bambusæ*. Mr. Laing has specimens of *arundicolens* from Swain and it is undoubtedly our species I find under certain circumstances it can live on some of our native grasses.

*MYZOCALLIS ARUNDINARIÆ* Essig.

*Eucallipterus arundicolens* Clarke, Davidson.

*Myzocallis arundicolens* Clarke, Essig (part).

Essig, Univ. Calif. Publi. Entomo, I., 302-305 (1917); Essig, Pomona Journ. Ent., IV., 762 (1912) (= *M. arundicolens* Clarke in part); Davidson, Journ. Eco. Ent., VII., 129 (1914); Swain, Univ. Calif. Publi. Tech. Bull., III., 1, 24, 13, fig. 268 (1919); Laing, Ent. Mo. Mag., IX., 3rd Se., 244 (1923); Takahashi, Aph. Formosa II., 62 (1923).

*Alate viviparous female.* Green; very pale green to rich grass green. Segment i. of antennæ larger than ii.; iii. longer than iv. and vi., with 4 to 6 sensoria near base. Cauda, anal plate and cornicles pale. Rostrum pale, reaching just past second coxæ. Veins dark, faintly clouded, especially at apices. Cauda and bilobed anal plate hairy.

Length 1.5 to 2.2 mm.

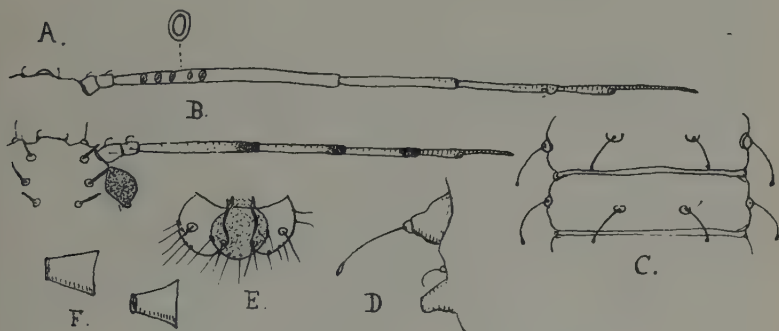


Fig. 155.—*Myzocallis arundinariæ* Essig.

A. Antenna of alate ♀; B. of apterous viviparous ♀; C. Body hairs; D. Cornicle and hairs; E. Cauda and anal plate; F. Cornicles.

*Apterous viviparous female.* Pale translucent green to pale rich green, with deeper green markings. The antennæ have dusky areas at the apices of segments iii. to v. Head and body with

numerous hairs, which are dark, especially on head; those on body slightly capitate. Rostrum thick, short, reaching to first coxæ. The small cornicles dusky. Tibiæ with five hairs; femora with a few hairs.

Length 1.2 to 2.5 mm.

FOOD PLANTS. *Arundo donax*; *Arundo* spp.; *Arundinaria japonica*.

LOCALITIES. Wisley, Surrey, vii. 23 (Fox Wilson). America (Essig); Shikoku, Japan, iii. 19 (Takahashi).

Observations. First found in this country by Mr. Fox-Wilson. Common on Bamboos in the United States. Originally confused with *M. arundicolens*.

#### MYZOCALLIS MYRICÆ Kalténbach.

*Aphis myricæ* Kalténbach.

*Agrioaphis myricæ* Walker.

Kalténbach, Mono. Pflanz., 96 (1843); Walker, List. Homop. (B.M.), IV., 128, 1003 (1852); Jackson, Scot. Nat., 55-59, figs. 1-3 (1922).

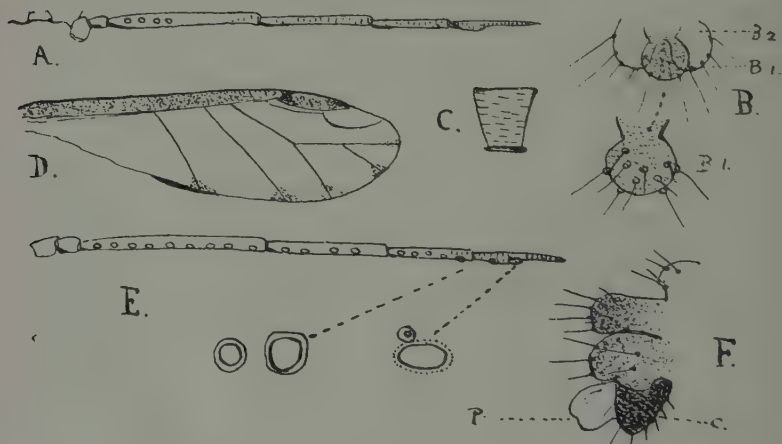
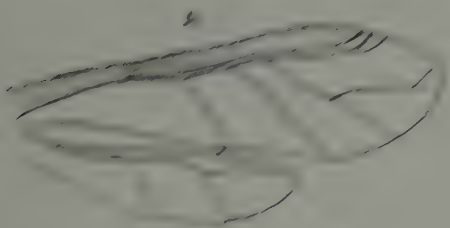


Fig. 156.—*Myzocallis myricæ* Kalténbach.

A. Antenna of alate ♀; B. Cauda and anal plate; C. Cornicle; D. Wing; E. Antenna of ♂; F. p. penis, c. claspers.

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imbricate. Wings short, veins clouded at tips. Legs rather short and thin ; a few hairs on tibiae.

*Length* 1.7 mm.

*Male.* Alate. Antennæ as long as body ; segment i. wider but no longer than ii. ; iii. longer than iv., with 8 to 10 round sensoria, more or less evenly placed along whole segment ; iv. a little longer than v., with 4 round sensoria ; v. with 3 to 4 small and the usual large sub-apical sensorium ; vi. a little shorter than v., flagellum slightly longer than base, basal area has a single secondary sensorium and the usual one at junction of the two areas is oval, the outer contour dotted and a small sensorium near it. Male organs as figured ; claspers black ; penis pale and blunt. Wing as in alate female, but in the only specimen seen showing no clouding at the apices of the veins. Black areas on dorsum of abdomen.

*Length* 1.5 mm.

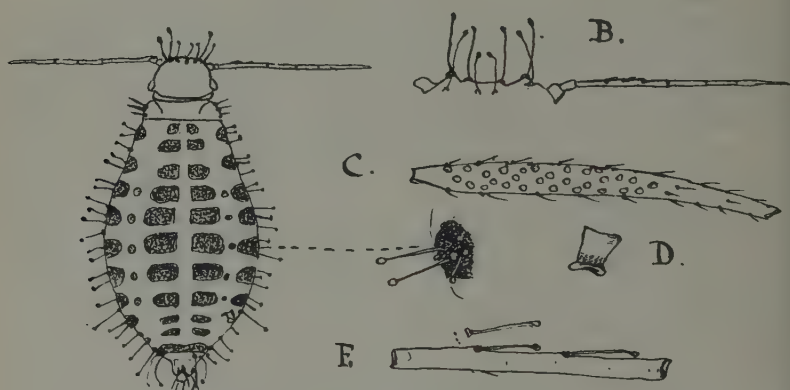


Fig. 158.—*Myzocallis myricæ* Kaltenbach.  
Oviparous ♀; B. Head and antenna; C. Hind tibia; D. Cornicle;  
E. Antennal hairs.

*Oviparous female.* Appearing to the naked eye, of a deep yellow colour, under the magnifying glass it is seen to be greenish-yellow, with brown spots on thorax and abdomen as illustrated. Cornicles same colour as body, tipped with light brown. Antennæ very pale green, segment vi. brownish. Legs pale ochreous-green, tarsi brown. Eyes red. Body hairs capitate. Antennæ

much shorter than body; segment i. larger than ii.; iii. the longest, as long as iv. + v., with two marked long capitate hairs, closely appressed to segment, arising from marked notches; iv. longer than v., with one marked hair arising from a distinct notch, this capitate hair outstanding; vi. about as long to slightly longer than iv., its basal area not quite so long as flagellum. Body hairs long and capitate, 2 long and 2 short ones arising from each rugose lateral dark spot. Hairs of cauda and anal plate simple. Legs short and hind tibiæ thick, many round sensoria on basal three-quarters and with numerous short hairs. Cornicles showing a few fine striæ at apices; more or less cylindrical. Hairs on body caudad, long, somewhat curved, slightly capitate.

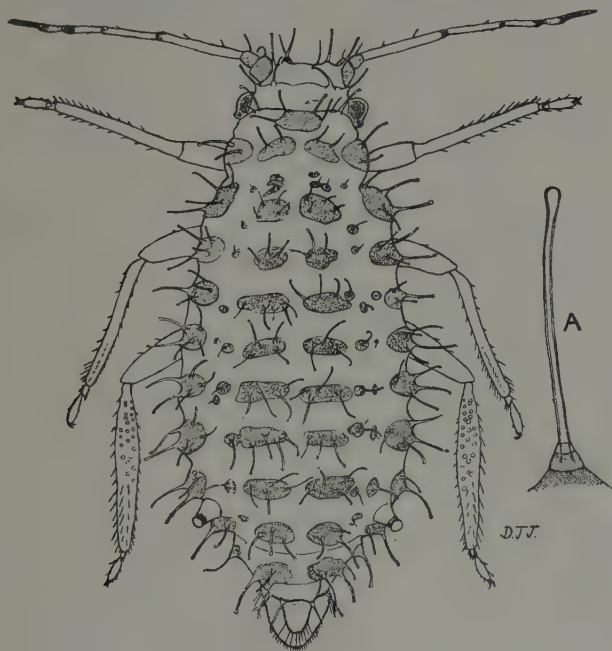


Fig. 159.—*Myzocallis myricæ* Kaltenbach.  
Oviparous ♀; A. Capitate hairs of body (Jackson).

*Nymph.* Like apterous female, but antennæ have junctions of iii. and iv., iv. and v. and v. and vi. and the median portion of vi. grey.

FOOD PLANT. Bog Myrtle (*Myrica gale*).

LOCALITY. Inversan, N.B., 15 ix. 20 (D. J. Jackson). Near Lyndhurst, New Forest on a large area of *Myrica*, very sparingly (Laing).

*Observations.* Taken for the first time in Britain since Walker's record by Miss D. J. Jackson, who described the oviparous female and male. It is a very marked and pretty species which she found on the under surface of the Bog Myrtle leaves; it was scarce, usually only one specimen occurring on each leaf and only a very few trees or a bush being affected. Occasionally as many as three occurred on one leaf. The apterous females were most common. Kaltenbach found the alate viviparous female, larva and nymph under the leaves in July and August, not very commonly. Walker's specimens are still in the British Museum.

MYZOCALLIS ANNULATA Hartig.

*Aphis annulatus* Hartig.

*Aphis quercus* Kaltenbach.

*Callipterus quercus* Koch.

*Myzocallis quercus* Passerini.

*Tuberculatus quercus* Mordwilko.

*Aphis suberis* Tavares.

*Subcallipterus quercus* V. d. Goot.

Hartig, Zeit. Ent. Germar, III., 369 (1841); Kaltenbach, Mono. Pflanz., 98 (1843); Koch, Die Pflanz., 218, figs. 290-291 (1857); Walker, Cat. Homop. (B.M.), IV., 943 (1852), Ann. Mag. N.H. (11), I., 337-340 (1848) and Zool. 28., 1999 (1870); Passerini,

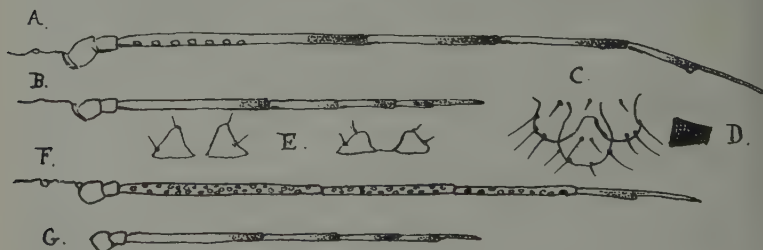


Fig. 160.—*Myzocallis annulata* Hartig.

A. Antenna of alate ♀; B. of oviparous ♀; C. Cauda and anal plate; D. Cornicle; E. Abdominal processes; F. Male antenna; G. Apterous ♀ antenna.



Aphid. Ital., 34, 2 (1863) ; Mordwilko, Varshara Univ. Izviestina, VIII., 60 (1894) ; Van der Goot, Beít. z. Kennt. d. Holl. Blattläuse 313 (1915) ; Schouteden, Mém. Soc. Ent. Belg., XII., 211, 313 (1906) ; Buckton, Mono. Brit. Aphid, III., 21, pl. XC (1880) ; Van der Goot, Overgedrukt. u.h. Tijds. v. Ent., LVI., 120 (1913) ; Davidson, Journ. Eco. Ent., VII., 130 (1914) ; Theobald, Bull. Ent. Res., IV., 334 (1914) ; Swain, Univ. Calif. Publi. Ent., III., 27, figs. 31, 32, 58 (1919) ; Shinji, Ent. News, XXVIII. 62-64 (1917).

*Alate viviparous female.* Yellow to pale green ; abdomen with obscure brown bars and markings, with 6 blunt tubercles in two rows and a pair of dorsal median pale tubercles in mid region. Antennæ broadly banded with deep brown at apices of segments iii. to v. and at junction of base and flagellum of vi. Cornicles black. Antennæ as long as or a little longer than body; segment i. often dusky at apex ; iii. long, about as long as iv. + v., with 5 to 7 round sensoria on basal half ; iv. slightly longer than v., the dark apical band nearly half as long as segment ; v. a little shorter than vi.; the latter with flagellum as long as basal area or a little longer ; base pale, sensoria normal. Rostrum short and thick, not reaching much past first coxæ. Cornicles short, jet black, somewhat expanded basally. Cauda and anal plate pale yellow; anal plate deeply cleft, with many hairs. Cauda knob-like and rounded with long hairs. Head with two marked papillæ each having a long hair. Legs pale yellow, apices of tibiæ faintly dusky ; tarsi dusky. Wings large ; venation normal, apices of veins faintly clouded. Abdominal tubercles sometimes brownish.

*Length* 2 to 2.2 mm.

*Apterous viviparous female.* Yellowish to pale green, flattened ; antennæ with four brown rings. Eyes deep reddish. Cornicles dark. Abdomen with 6 tubercles with capitate hairs on each lateral edge. Antennæ not so long as body. Capitate hairs in front. Legs pale yellow.

*Length* 1.4 to 1.7 mm.

*Oviparous female.* Apterous. Yellow to rusty pink, with now and then greenish stains ; antennæ with four dark bands ; cornicles with a dusky stain at apices or on one side. Eyes deep red to black. Tarsi dusky. Antennæ shorter than body ; apices of segments iii. to vi. broadly banded with deep brown ; iii. longer

than iv., but not so long as iv. + v. ; iv., v. and vi. about equal ; flagellum of latter about equal to basal area. Head with two large tubercles from each of which arises a long capitate hair. Rostrum reaches just past second coxæ. Body with hairs, markedly ringed and tuberculate. Anal plate and cauda prominent, rounded, hairy. Hind tibiæ rather thickened, but not so thick as femora. Black ova shine through body.

*Length* 2 mm.

*Male.* Alate. Antennæ very long ; dusky green. Cornicles and genitalia dark. Abdomen with dark bars and tubercles. Segment iii. of antennæ longer than iv., with many round sensoria ; iv. longer than v., with many sensoria over whole length ; v. about as long as vi., with a few sensoria ; vi. with flagellum as long as basal area, which has 1-2 sensoria. Head with 2 hairs arising from tubercles. Penis and claspers dark, former truncate. Wings large.

*Length* 1.7 mm.

FOOD PLANTS. *Quercus sessiliflora* ; *Q. ilex* and *Castanea pumila*.

LOCALITIES. General over Great Britain ; U.S.A. ; Cape Colony ; also New Zealand.

*Observations.* Occurs on the Oaks from spring to November. The sexuales commence to appear in October and continue to mid November. The female lays several shiny black eggs, which shine through the body, giving a mottled appearance. They are sometimes laid on the twigs, at others on dead leaves. It can be told from *querceus* by the longer and more pronounced banded antennæ, black cornicles in the alate female and by the absence of the large dorsal tubercles. The young are almost white.

Shinji (Ent. News, February, 1917) described three species from Oaks, *M. essiggi*, *W. woodworthi* and *M. hyalinus* ; according to Swain these are all varieties of *querceus* Kalt. which is undoubtedly only Hartig's *annulata*. In New Zealand it seems likely to become of some economic importance.

MYZOCALLIS QUERCEUS Kaltenbach.

*Aphis querceus* Kaltenbach.

*Tuberculatus querceus* Mordwilko.

*Myzocallis querceus* Passerini.

Kaltenbach, Mono. Pflanz., 3, 136 (1843); Walker, Ann. Mag. (N.H.) (11) I., 340-341 (1848); Passerini, Gli Afidi, 28 (1860); Schouteden, Mém. Soc. Ent. Belg., XII., 211 (1906).

*Alate viviparous female.* Various shades of green; abdomen more or less mottled with deeper green and yellow. Head yellow. Thoracic lobes yellowish-brown. Antennæ pale, much longer than body; apices of iii., iv. and v. with very narrow dark bands; vi. dusky; bands not nearly so marked as in *quercus*. Cornicles short, truncate, dusky, a long hair at base of each. Cauda and anal plate yellow, with several hairs. Antennal segment iii. long, longer than iv. with 9 to 11 round sensoria nearly reaching to apex; iv. longer than v.; vi. with long base, flagellum a little longer than base. Rostrum short and thick, reaching to second coxæ. On second abdominal segment a large dark forked process, on each side a large tubercle, dark and with an apical hair and a smaller one in front of it. Legs green; a dark spot near apex of hind femora; tarsi dusky; hairy. Stigma darkened on each side; apices of veins dusky. Hairs on head, etc., simple. Body more or less clothed with fine white or grey meal.

Length 1.4 to 1.7 mm.

FOOD PLANTS. Oaks (*Quercus* spp.).

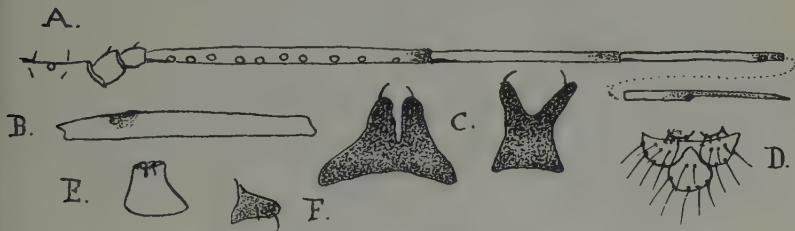


Fig. 161.—*Myzocallis quercus* Kalt.

A. Antenna of alate ♀; B. Hind femur; C. Abdominal dorsal processes; D. Cauda and anal plate; E. Cornicle; F. Lateral abdominal papilla.

LOCALITIES. Guildford, 20 v. 13; Wye, v. to x.; Hastings, v. 11; Richmond Park, vi. 07; Criccieth, North Wales, viii. 01; Shadoxhurst, Kent, vii. 25 (F.V.T.); Ross-shire, N.B. (D. J. Jackson); Kew Gardens. Very rare in my experience (Laing).

*Observations.* This does not appear to be a common species like *quercus*. It can at once be distinguished from the latter by

(1) the large furcate process on the abdomen, (2) the less markedly banded antennæ; (3) the sensoria on iii. being more numerous and reaching to nearly the apex of the segment. When alive it has a decided mealy appearance and it skips from the leaves when disturbed in the manner of a Leaf-Hopper. I have never found apteræ or sexuales. I do not think that Buckton's *quercus* is this species. Mr. Laing writes: "Buckton had slides of the true *quercus* from Walker, but I agree with you that his description applies to *quercus* (*annulata*) only. No-one who has once seen the alate ♀ with its remarkable tubercle would ever mistake it for anything else."

MYZOCALLIS MINIMUS V. d. Goot.

*Pterocallis minimus* V. d. Goot.

*Subcallipterus minimus* V. d. Goot.

Van der Goot, Tijds. v. Ent., LV., 83, ff. 12, 13 (1912); Van der Goot, Z. Syst. d. Aphiden, 119 (1913).

*Apterous viviparous female.* Pale green to pale yellowish-green, with numerous capitate hairs. Apex of antennal segment vi. dark. Eyes black. Tarsi slightly darkened, apex black. Antennæ about half length of body; segment i. much larger than ii.; iii. much the longest, about as long as iv. + v.; iv. very slightly longer than v.; vi. a little longer than iv., its base about

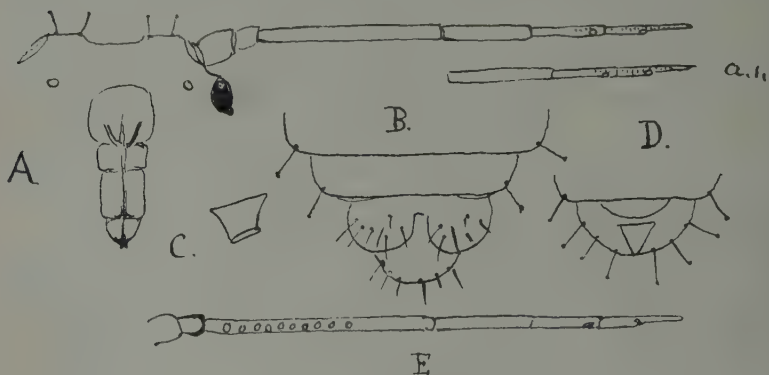


Fig. 162.—*Myzocallis minimus* V. d. Goot.

A. Head and antenna of apterous ♀; B. Anal plate and cauda; C. Cornicle; D. Apex of larva; E. Alate ♀ antenna.

as long as the flagellum ; sensoria on v. and vi. normal. Two marked deep red stemmata between eyes. Rostrum very short and thick, reaching only half way to second coxæ, apex black. Cornicles pale, short, truncate, apex widely flared. Anal plate deeply indented, each lobe with several short hairs. Cauda rounded. First pair of legs a long way from second ; second and third close together ; rather short ; femora thick ; tibiæ with numerous hairs. Pro-, meso- and meta-thorax well defined ; also the two segments caudad of cornicles. Hairs on head and posterior of body rather long and capitate.

*Length* 1.3 mm.

*Immature apteræ.* Very pale green, almost translucent ; antennæ similar to former ; body with capitate hairs all over ; cauda cone shape, apex acute.

*Nymph.* Very similar, with long capitate hairs ; wing pads pale.

*Alate viviparous female.* Bright greenish to yellowish-green ; head and meso-thorax brownish-yellow ; eyes brownish ; antennæ

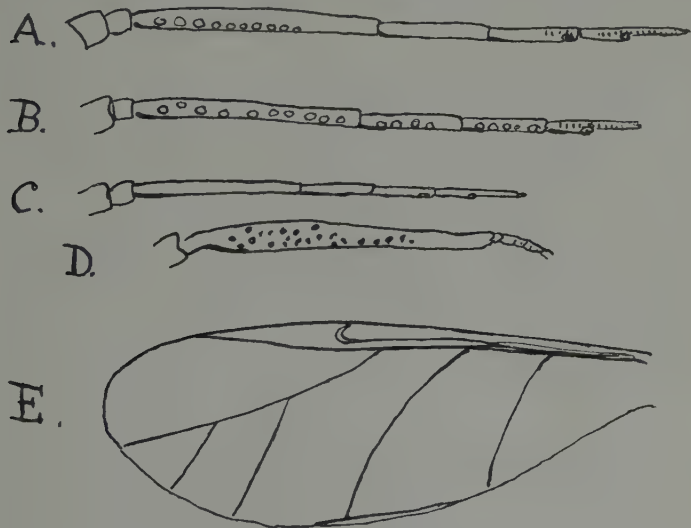


Fig. 163.—*Myzocallis minimus* V. d. Goot.

A. Antenna of alate ♀ ; B. of Male ; C. of oviparous ♀ ; D. Hind tibia of oviparous ♀ ; E. Fore Wing. (V. d. Goot.)

yellow when first hatched, gradually darkening ; legs pale green or yellow ; tarsi black ; apices of tibiæ dusky ; rostrum, cauda, anal plate and cornicles pale ; longish hairs on head, shorter on body. Antennæ shorter than body ; iii. about twice as long as iv., with 8 to 10 slightly oval sensoria not reaching to apex, some roundish ; iv. longer than v. ; flagellum short, only a little longer than base of vi. Anal plate bilobed ; cauda knob-shaped, both bristly.

*Length* 2.2 to 2.5 mm.

**FOOD PLANT.** Birch (*Betula alba*).

**LOCALITIES.** Evanton, Ross-shire, vii. 25 ; Strathpeffer, N.B. 22 ix. 21 (Miss Jackson) ; Aberdeen (Buckton) ; Shadoxhurst, 28 iv. 26 (F.V.T.) ; Storeton, Cheshire, 3 ix. 24 (Dallman) ; New Forest, near Cadnam (Laing).

*Observations.* I have only seen the apteræ and alate viviparæ and append Van der Goot's description of the oviparous female and male. Those I found at Shadoxhurst lived singly under the Birch leaves ; it seemed very uncommon there. The immature forms look like a distinct species owing to the short pointed cone shaped cauda.

*Wingless oviparous female.* Körper hellgelb oder hell grünlich gelb ; der Kopf braunschwarz. Auf allen Körperringen breite schwarze Querbinden, welche auf dem hinteren Teil zu einem grossen Rückenflecken zusammenfliessen. Ein schmaler, hellgelblicher Rückenstreifen läuft meist vom Kopfe bis an die Hälfte des Hinterleibes hinunter. Die Seiten sind meist etwas hellrötlich gefärbt und tragen schwarze Fleckchen. Augen dunkelbraun. Fühler schwarz, die Basis des dritten Gliedes hellgrünlich. Beine hellgelblich. Tarsen schwarz. Siphunculi und Cauda hellgelblich. Körper oval, ein wenig gewölbt, mit nur wenigen Härchen. Die letzten Körpersegmente in eine Art Legeröhre ausgezogen. Fühler kurz, von halber Körperlänge ; Längenverhältniss der letzten Glieder wie 30, 16, 15, 9, 7. Das dritte Glied trägt keine Riechplatten. Primäre und Nebenriechplatten mit feinem Haarkranz. Rüssel kurz, ein wenig über das 1<sup>e</sup> Coxenpaar hinausreichend. Siphunculi sehr kurz. Cauda klein, etwas Kolbenförmig an der Basis nicht eingeschnürt. Analplatte breit, nicht eingeschnitten ; am Hinterrande derselben finden sich 2 kleine rudimentäre



Gonapophysen vor. Die Schienen des hinteren Beinpaares sind verdickt und tragen ringsum etwa 50 — 60 gut ausgebildeten Sensorien.

*Length* 2.60 to 2.70 mm.

*Wingless male.* Kopf und Thorax schwärzlich grün. Hinterleib hellgrünlich, mit schwarzen Seitenflecken und schwarzen Querbinden, die am hinteren Ende zu einem Rückenflecken zusammenfliessen. Meist findet sich auch noch ein rötlich gefärbter Rückenstreifen vor. Augen schwarz. Fühler grauschwarz. Beine weisslich. Tarsen schwarz. Siphunculi hellgrünlich, Cauda olivengrün. Körper länglich oval, ohne Härchen. Fühler kurz, van etwa halber Körperlänge; Längenverhältniss der letzten Glieder wie 25, 11, 12, 9, 8. Alle diese Glieder tragen Riechplatten und zwar meist iii. 15, iv. 5, v. 5 + 1 vi. 3 + 1 (+4). Die primären und die secundären Riechplatten haben einen feinen Haarkranz. Rüssel kurz, etwas über das 1<sup>e</sup> Coxenpaar hinausreichend. Siphunculi sehr kurz. Cauda klein, warzenförmig; die Analplatte scheint nicht eingeschnitten zu sein. Die "Haftzangen" sind klein und etwas zugespitzt.

*Length* 1.66 × 0.79 mm.

Genus CHROMAPHIS Walker.

Walker, Zoologist, V., 2001 (1870); Baker, Bull. 826, U.S. Dept. Agri., 27 (1920); Essig, Pomona Journ. Ent., IV., 3, 763 (1912).

Cornicles moderate, truncate, flanged. Antennæ moderately long, of 6 segments, the "nail" small; sensoria oval. Cauda knobbed. Anal plate slightly indented. Wings normal, not held horizontally in repose. Males alate. Oviparous females apterous. Viviparæ all alatae. *Type* set by Walker *Aphis juglandicola* Kaltenbach. A single species only occurs.

CHROMAPHIS JUGLANDICOLA Kaltenbach.

*Lachnus juglandicola* Kaltenbach.

*Callipterus juglandicola* Passerini.

*Aphis juglandicola* Walker.

*Pterocallis juglandicola* Buckton.

*Chromaphis peglandicola* Walker\*.

\* *Peglandicola* should be described as misprint and not new name (F. Laing).

Kaltenbach, Mono. Pflanz., 151, 4 (1843); Walker, Ann. Nat. Hist. Se. 2, I., 15, 343 (1848); Cat. Hemipt (B.M.), IV., 15, 945 (1852); Koch, Die Pflanz., 224, pl. 40, figs. 295, 296 (1857); Walker, Zool., V., Se. 2, 2001 (1870); Theobald, Notes Insect Pests in 1894, 17, pl. 4, figs. 4-6 (1895); Schouteden, Mém. d.l. Soc. Ent. Belg., XII., 209 (1906); Theobald, Insect and Allied Pests of Fruit, 316 (1909); Essig, Pomona, Coll. Journ. Ent., I., 51, 1909 and IV., 3, 763 (1912); Davidson, U.S. Dep. Agri. Bull. 100, 2-19 (1914); Swain, Univ. Calif. Publi. Ent., III., 28, 23, figs. 34-35 (1919).

*Alate viviparous female.* Yellow of various shades from pale lemon to orange-yellow, some with a pallid green hue; thoracic lobes orange-brown to brown. Antennæ same colour as body, but with apices of segments iii. to vi. dusky; much shorter than body; Rostrum yellow, apex dusky, reaching to second coxæ or beyond. Abdomen often semi-translucent. Legs yellow;

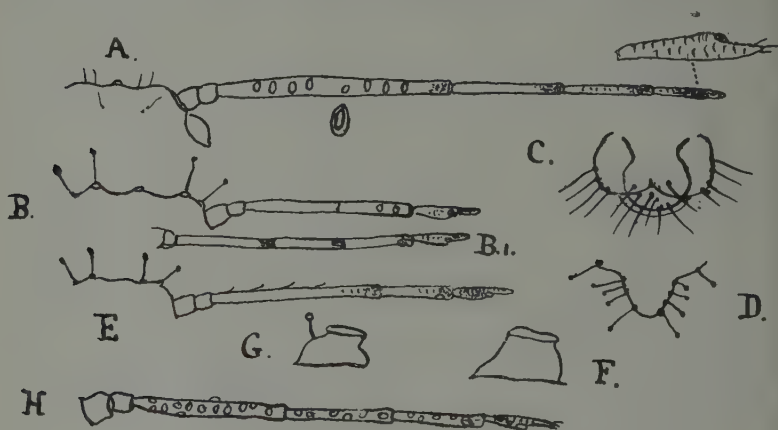


Fig. 164.—*Chromaphis juglandicola* Kaltenbach.

A, C, F. Alate ♀; Antenna; Anal plate and cauda; cornicle; B. Antenna of oviparous ♀; E. and D. Nymph; G. Cornicle of nymph.

hind femora with a dark spot near apex; tarsi dusky. Wings normal, but venation often very erratic; veins yellow, some dusky marks on stigma and origin of some of the veins faintly clouded, but not in all cases. Cauda and anal plate yellow. Segment i. of antennæ broader than ii., but not so long; iii. longest but

shorter than iv. + v + vi., with 6 to 8 oval sensoria and a small round one near apex; iv. a little longer than v.; v. longer than vi.; the latter with a very small "nail."

*Length* 1.5 to 1.8 mm.

*Apterous female (Stem Mother).* Yellow, pale translucent green to pale lemon-yellow. Eyes red. Legs yellow or pale green; when mature femora with dark spot near apex as in alate female (absent in young forms). Abdomen shows more or less two dark rows of spots and these spread on to the thorax, now and then these dorsal spots meet on the abdomen. Cornicles yellow or green, apices sometimes dusky. Antennæ short, yellow or green, semi-transparent, apices of segments dusky. The long hairs are capitate. Antennæ much shorter than body; segment iii. longest; "nail" very small. Rostrum pallid, very short, scarcely reaching first coxæ. Cephalic hairs capitate and arise from prominent tubercles. At the last moult many of the capitate hairs are shed, especially on the dorsum.

*Length* 1.2 to 1.7 mm.

*Oviparous female.* Apterous. Pale yellow, often semi-transparent; 5 to 6 pairs of dark spots on abdomen and sometimes 2 on thorax. Apices of short antennæ dusky; a dark spot near apex of hind femora. Antennæ often no longer than head and thorax; segment i. a little longer than ii.; iii. a little longer than iv.; iv. with single primary sensorium, but in one specimen there are two sensoria; "nail" small. In final stage of oviparous female the antennæ are of 6 segments; iii. longer than iv.; iv., v. and vi. nearly equal; the body markings also differ, there being a large dark patch on the meso-notum and a still larger dark median abdominal area. Prominent capitate hairs on head and the body has many shorter capitate hairs. Legs pallid, except for a small black spot on hind femora near apices; hind tarsi slightly swollen and hairy, but I can detect no sensoria. Davidson says "about 35, occurring evenly on the middle two-thirds of the tibia and arranged in an irregular spiral." Cauda large, globular, Anal plate indented and extending beyond cauda, both pale and hairy. In some specimens the tips of the antennal segments are dusky. Rostrum yellow, reaching to second coxæ; apex black.

*Length* 1.5 to 1.7 mm.

*Male.* Alate. Pale greenish-yellow to yellow. Head and thorax dusky, sometimes greyish-black ; scutellum dark. Antennæ yellow, apices of segments dusky. Legs yellow with grey apices to femora and tibiæ ; tarsi grey, also black femoral spots on hind and mid legs. The small abdomen has 2 to 4 grey spots on posterior end, the last or only pair being between the yellow cornicles. Cauda pale and globular. Sexual organs pale yellow. Rostrum yellow, short, just passing first coxæ. Wings with pale yellow insertions and grey stigma with pale central area ; veins grey. Segment i. of antennæ broader but no longer than ii. ; iii. longer than iv. with 12 to 18 oval sensoria ; iv. about as long as v., with 3 to 6 sensoria ; v. with 3 to 4 + 1 ; vi. shorter than v. with 1 to 2 sensoria beyond the usual primary one at base of short " nail."

*Length* 1.5 to 1.7 mm.

FOOD PLANTS. Walnuts (*Juglans spp.*).

LOCALITIES. Kingston-on-Thames, vi. 07 ; Esher, vii. 94 ; Taplow, vi. 90 ; Little Hadham, Herts., vi., and xi. 14 ; Wye, v. to ix ; Great Staughton, Hunts., vii. 90 ; Oxford, vii. 16 (F.V.T.) ; Enfield ; Kew Gardens ; Letchworth (Laing). All over Europe. Oregon (Wilson and Lovett) ; California (Swain, Essig) ; Colorado (Gillette).

*Observations.* This Aphid does not seem to be common, except in the Thames Valley, where I have known it do much damage. In 1890 and 1894 it was particularly destructive at Kingston-on-Thames, Taplow and Esher and in 1907 it caused not only damage to the foliage but also attacked the young nuts. The damage is mainly due to the insects sucking the sap from the foliage, which in consequence turns yellow. In America much soot fungus is found to follow, which I have not yet observed here. Young trees have been so heavily infested that spraying had to be resorted to on several occasions. It appears to have been introduced into America from Europe on nursery stock. Swain says it is the most abundant and injurious of the Walnut species in California and in certain seasons in S. California it is an important pest. Essig also refers to its economic importance there and to its sudden appearance in countless numbers. Davidson says that many nuts mature half size, covered on the upperside with the black soot fungus which thrives on the sticky

exudations of the Aphids. The whole life-cycle takes place on the Walnut. Unlike most Aphides there is no asexual apterous female. All those figured have either been "Stem Mothers," larvæ or oviparous females. The sexuales appear from the end of July to October in this country, rarely in November. The females will lay from 8 to 20 eggs, which are at first yellow and later become shiny black, with marked hexagonal sculpturing. They are placed amongst the hairs in the young wood, more frequently around the fallen leaf scar, but also on the branches. I have never seen them on the bark of the stems, where they also occur in America. The ova hatch in April and the young pass to the buds or young leaves and mature into the Stem Mothers, which deposit their young on the under sides of the leaves. These become nymphæ and in a few days (up to 14) the alate viviparæ appear and place their young under the leaves. The insects cluster along the veins and later get on to the young nuts, if they are very abundant. These young grow into nymphæ without becoming mature apterous females in from 14 to 21 days and this goes on until the end of July and even the beginning of September. The first sexuales may appear in late July, now and again in small numbers, but the majority from September to November. I have not observed any parasites or predaceous enemies attacking this species, nor attended by ants as they are in America. Walker renamed this insect in 1870 *Chromaphis peglandicola*. Mr. Laing thinks this is a printer's error.

## Genus CALLIPTERUS Koch.

*Callaphis* Walker.

*Ptychodes* Buckton.

*Panaphis* Kirkaldy.

*Nippocallis* Matsumura ?

Koch, Die Pflanz., Aphid, 208 (1857) ; Walker, Zool., V., 2000 (1870) ; Buckton, Mono. Brit. Aphid., III., 39 (1880) ; Kirkaldy, Entomologist, XXXVII., 279 (1904) ; Matsumura, Journ. Coll. Agri., Tohoku Univ., VII., 6, 365 (1917) ; Baker, Bull. 826, U.S. Dep. Agri., 27 (1920).

Cornicles truncate, rather prominent, armed with long hairs. Antennæ longish, of 6 segments ; flagellum about as long as basal area ; with oval sensoria and stout hairs. Cauda more or less

knobbed. Anal plate bilobed. Wings normal; veins bordered with colour. Body with many hairs. Oviparae apterous, very similar to viviparae. Free living species. Koch included several species in his genus *Callipterus* amongst them *juglandis* Frisch; in 1860 Passerini set this species as the type of *Callipterus* and erected his genus *Myzocallis* for all species similar to the *coryli* of Goetze.

A single species only is so far recorded from Great Britain.

#### CALLIPTERUS JUGLANDIS Frisch.

*Aphis juglandis* Frisch and Goetze.

*Lachnus juglandis* Kaltenbach.

*Callipterus juglandis* Koch.

*Ptychodes juglandis* Buckton.

*Juglandifex* Amyot.

*Panaphis juglandis* Kirkaldy (1904).

*Pterocallis juglandis* V. d. Goot (1915).

Frisch, Ins., XI., 12, 10, pl. 16, figs. 1 to 5 (1750); Goetze, Ent. Beit., II., 311 (1778); Gmelin, Ed. Syst. Nat., 1, 2210, 70 (1780); Blanchard, Hist. Nat. Ins., III., 205 (1840); Walker, Ann. Nat. Hist., Se. 2, I., 443, 17 (1848); Kaltenbach, Mono. Pflanz., I., 150, 3 (1843); Amyot, Ann. Soc. Ent. Fr. Se. 2, V., 48; Walker, List. Homop. (B.M.), IV., 947, 17 (1852); Koch, Die Pflanz., 222, 10, pl. 40, figs. 295-296 (1857); Buckton, Mono. Brit. Aphid., III., 40, pl. XCV. (1880); Passerini, Aphid. Ital., 66 (1863); Schouteden, Aphid. Belg., 209 (1906); Theobald, Notes Insect Pests in 1894, 15, pl. V. (1895); Theobald, Insect Pests of Fruit, 313, fig. 212 (1909).

*Alate viviparous female.* Yellow to bright yellow with dark markings; head, prothoracic band, thoracic lobes and metanotum deep brown. Body with large dark dorsal patches and 5 deeper lateral spots. Cornicles short, either all deep brown or with brown bases only. Antennae much shorter than body, yellow, apices of segments iii. to v. dusky; vi. dark. Legs yellow, except tarsi, which are dark and a large dark area near apex of hind femora. Cauda and bilobed anal plate yellow to yellowish green. Veins of wings tinged with deep brown along the membrane and expanded areas occur at their apices and the costal area and stigma dark. Segment i. of antennae wider but little



longer than ii., both darker than iii.; iii. much longer than iv. + v. + vi., with 15 to 18 oval sensoria over whole length, except just near apex; iv. a little longer than v.; vi. more than half v., spur very small, several long pale hairs on iii.; one to two on iv. and 2 on v. Hairs on head and body long, fine and numerous. Cauda and deeply emarginate anal plate with many long hairs. Legs hairy.

*Length 2 to 2.8 mm.*

*Apterous viviparous female.* Yellow with green and almost orange shades and with deep brown cephalic and thoracic markings; on the abdomen four long rows of deep brown squarish spots. Antennæ yellowish, dusky at apices, much shorter than body, of 5 segments; i. broader but no longer than ii.; iii. longer than iv. + v.; iv. a little longer than v.; "nail" shorter than basal area; ii. to iv. with long hairs. Rostrum yellow, short and rather thick, reaching just past first coxæ. Head and body with rather long, thin hairs. Legs yellow, rather short and thick; tarsi dusky; femora and tibiæ with stiff outstanding pale hairs. Cauda yellow. Anal plate dusky, with long hairs. Thin dark bars may be seen under the microscope between the large dark median patches.

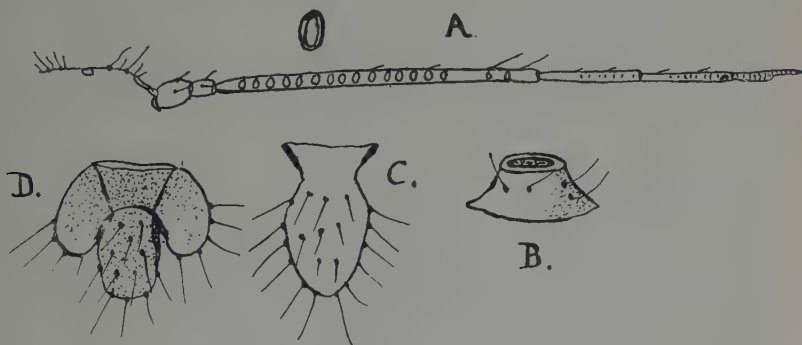


Fig. 165.—*Callipterus juglandis* Frisch.

A. Antenna of alate ♀; B. Cornicle; C. Cauda; D. Cauda and anal plate.

*Length 2.8 to 3 mm.*

*Oviparous female.* Apterous. Yellow to yellowish-green; head and thorax dark; dark square spots in four rows on the body as in apterous viviparæ and some small black lines between.

Antennæ very short, yellow, apices of segments iii. to v. and all vi. dusky ; iii. as long as iv. to vi. ; iv. a little longer than v. ; v. a little longer than vi., latter with a very short " nail," about half of basal area ; ii. to v. with long hairs on one side. Rostrum thick, very short, not reaching first coxæ. Anal plate dusky to dull yellow. Cauda yellow, knob-like, with many hairs. Fore and mid legs rather short, yellow except tarsi, which are dusky ; tibiæ and femora hairy ; hind legs long, apices of femora black ; tibiæ dark brown except for yellow apex ; hairy with many sensoria over all dark area ; tarsi dark.

*Length* 3.5 to 4 mm.

*Male.* Alate, wings with veins darkened along their edges and clouded at their apices as in alate females. Head and thorax large, dark brown. Abdomen small, yellow, with large dark median patches and smaller lateral ones ; last segment dark. Anal plate and cauda yellow, latter sometimes dusky to brown, both hirsute. Anal plate emarginate. Antennæ shorter than body, yellow to yellowish-brown ; segments i. and ii. dusky ; i. a little longer than ii. ; iii. longer than iv. + v. + vi., with 36 to 40 round sensoria, extending up to apex ; iv. with 6 to 8 sensoria, slightly longer than v., the latter with 6 sensoria ; vi. about half of v., the " nail " half to less than half length of basal area ; whole segment markedly imbricate. Eyes large. Rostrum very small. Legs yellow, moderately long and thin ; apices of fore and mid tibiæ and the tarsi dusky ; hind femora black near apex ; the long tibiæ hairy.

*Length* 2 to 2.3 mm.

FOOD PLANTS. Walnuts (*Juglans spp.*).

LOCALITIES. Kingston-on-Thames ; Taplow ; Great Staughton, Hunts. ; Little Hadham, Herts. ; Wye ; Stouting ; Faversham and Bromley, Kent (F.V.T.) ; Letchworth ; Enfield ; Kew Gardens ; Switzerland (Laing) ; Southgate, 19 viii. 47 (Walker).

*Observations.* This very marked Aphid which Buckton placed in a separate genus *Ptychodes* often occurs in great numbers on the upper surface of walnut leaves. I do not know the names of the six varieties of *Juglans* I have found it upon. It occurs during August, September and October as apteræ

and alatae and in the latter month as oviparae. The latter lay their eggs on the bases of the buds. The progeny from these ova become winged in July. Where these fly to we do not know. Alatae appear again on the Walnut leaves in August and September and produce larvæ which rapidly become apterous viviparous females in late September and October and in the latter month nymphæ appear and become alate males and others apterous oviparous females. This species is remarkable in that it lives on the upper side of the leaves. The description of the apterous viviparae is from some old notes made in 1889 and the single specimen I have in my collection.

Genus THERIOAPHIS Walker.

*Kallistaphis* Kirkaldy.

*Eucallipterus* Schouteden.

*Neocallipterus* Van der Goot.

Walker, Zoologist, V., 1999 (1870); Kirkaldy, Canad. Ent., XXXVII., 417 (1905); Schouteden, Ann. Ent. Soc. Belg., XXX., 31 (1906); Van der Goot, Beit. z. Kennt. d. Holl. Blattläuse 320 (1915); Baker, Bull. 826, U.S. Dept. Agri., 28 (1920).

Cornicles truncate; in some constricted near apex. Antennæ moderately long, with elongate oval sensoria. No very prominent hairs on antennæ. Prothorax rather elongate. Cauda knobbed. Anal plate bilobed, lobes rather long. Wings normal, variously adorned. Body with prominent hairs, often capitate. Oviparous females apterous. Males alate.

Type of genus *Aphis ononidis* Kaltenbach. This genus differs markedly from *Myzocallis* by the deeply cleft anal plate forming two marked lobes. *Eucallipterus* is evidently the same. Both Van der Goot and Kirkaldy make Kaltenbach's *betulicolus* as type, but as far as I can see *betulicolus* belongs to the same genus as *ononidis*.

Three species occur in Great Britain, *ononidis* Kalt., *betulicola* Kalt. and *tiliæ* Linnæus.

THERIOAPHIS ONONIDIS Kaltenbach.

*Aphis ononidis* Kaltenbach.

*Chaitophorus ononidis* Koch.

*Myzocallis ononidis* Passerini.

*Therioaphis ononidis* Walker.

*Chaitophorus maculatus* Buckton.

*Callipterus trifolii* Monell.

*Callipterus ononidis* Theobald.

Kaltenbach, Ent. Zeit., III., 173 (1846); Koch, Die Pflanz., 5, fig. 7 (1857); Passerini, Aphid. Ital., 53 (1863); Walker, Zoologist, V., 1999 (1870); Ferrari, Aphid. Liguriaë, 75 (1872); Buckton, Ind. Mus. Notes, IV., 277, pl. XVII., fig. 1 (1899); Monell, Canad. Ent., XVI., 14 (1882); Williams, Spec. Bull. 1, Univ. Nebr. Dept. Ent., 8 (1891); Osborn, Proc. Iowa Ac. Sci., I., pt. 2, 129 (1892); Osborn and Sirrine, Proc. Iowa Acad. Sci., I., pt. 3, 98 (1893); Ind. Mus. Notes, IV., No. 5, 277 (1899); Sanderson, 12th Ann. Rept. Del. Agri. Exp. Sta., 1900, 207 (1901); Sanborn, Kansas Univ. Sci. Bull., 3, no. 8, 251, 262 (1906); Davis, Ann. Ent. Soc. Amer., I., 256 (1908); Folsom, Bull. 134, Ill. Agri. Exp. Sta., 175 (1909); Davis, Journ. Eco. Ent., III., 419 (1910); Gillette, Journ. Eco. Ent., III., 369 (1910); Smith, Ann. Rept. N.J. State Mus., 1909, 116 (1910); Williams, Univ. Studies, X., no. 2, 32 (1911); Morrison, 5th Ann. Rept. St. Ent. Ind., 1911-1912, 216 (1912); Davis, U.S. Dept. Agri. Bur. Ent. Tech., Se. no. 26, pt. 11, 40 (1914); Theobald, Bull. Ent. Res., VI., pt. II., 134-138, figs. 25-26 (1915); Das, Aphid., Lahore Mem. Ind. Mus., IV., 244 (1918); Willcocks, Sult. Agri. Soc. Bull., 1, 49 (1922); Hall, Aphid. Egypt, 5 (1926).

*Alate viviparous female.* Head pale greenish-ochreous to pale yellowish-green. Two dusky lines in median area of head. Antennæ with segments i. and ii. pale or pale smoky; iii. ochreous with dusky apex; iv. to vi. dusky. Pronotum same colour as head, with some dusky lines. Meso-thorax pale or greenish, rather translucent; thoracic lobes darkened. Abdomen clear, bright, pale yellowish-green or greenish-yellow, with black spots; a lateral line of 7 black spots, one being close to or against the anterior or margin of cornicles. Cauda and anal plate same colour as abdomen. Cornicles pale, a dusky ring at apex. Wing insertions pale; costa smoky, pale at base; cubital vein with basal one-third pale, rest smoky or faintly greenish; stigma pale smoky. Legs ochreous; tarsi dusky. Venter pale yellow-green; under side of head and thorax more yellow. Antennæ not so long as body, of 6 segments; i. slightly longer and wider than ii.; iii. longest with 8 to 9 oval sensoria, not quite reaching

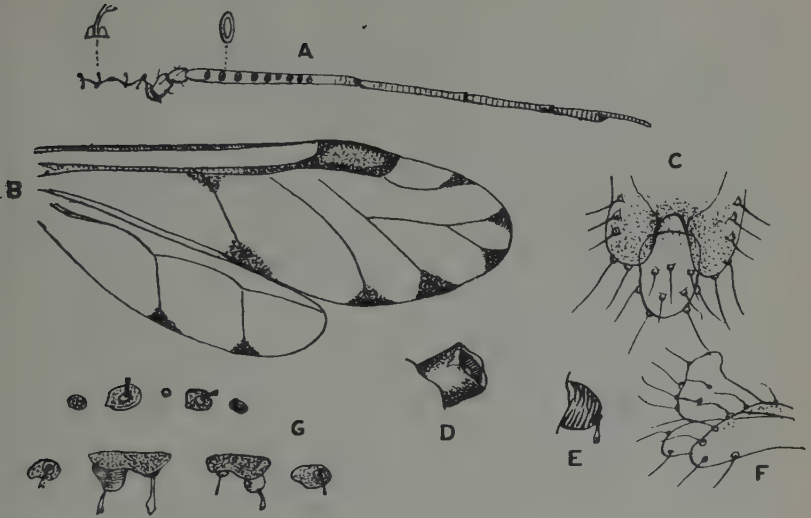


Fig. 166.—*Therioaphis ononidis* Kaltenbach.

Alate viviparous ♀. A. Head and Antenna; B. Wings; C. Cauda and anal plate; D. Cornicle; E. Lateral tubercle of abdomen; F. Side view of Cauda; G. Body Spines.

apex; iv. and v. about equal in length; vi. about as long as v., its basal area about as long as flagellum. Head with small blunt median swelling and slightly raised on each side at base of antennæ, with rather short, thick, clavate hairs. Rostrum reaching a little past first coxæ, rather thick, apex dusky. Wings ornamented as in figure. Cornicles small, no special ornamentation. Anal plate markedly bilobed, each lobe with 2 long hairs on apex and 3 on the outside. Cauda globular at apex, projecting between anal lobes, with some long hairs. In balsam preparations the abdominal spots each show a central clear area, from which arises a small tubercle, bearing a thick hair expanded at the apex, of various forms.

*Length* 2 to 2.5 mm.

*Apterous viviparous female.* Uniformly ochreous to pale greenish-yellow, covered with dusky tubercles from which arise strong hairs with expanded apices. Antennæ with segments i. and ii. yellowish; iv. dusky ochreous, shading to dusky apically;

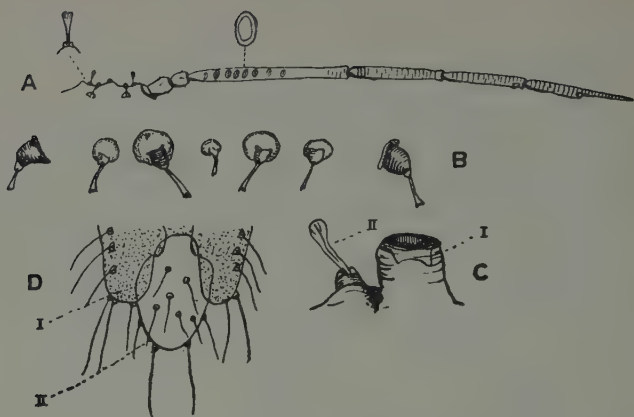


Fig. 167.—*Therioaphis ononidis* Kalténbach.

Apterous viviparous ♀. A. Head and antenna; B. Body hairs; C. Cornicle (i.) body hair (ii.); D. Cauda (ii.) and anal plate (i.).

v. and vi. dusky. Legs ochreous; tarsi dusky. Cornicles short, same colour as body, with dusky apical ring. Cauda same colour as body. Head with capitate hairs. Antennæ shorter than body; i. larger than ii., iii. longest with 7 to 9 oval sensoria, not extending to apex; iv. and v. nearly equal; vi. about as long as v., basal area as long as flagellum. Rostrum reaching past second coxæ, apex dusky. Anal plate and cauda as in alate female.

*Length* 2 mm.

*Male.* Alate. Head and thorax olive green; abdomen pale yellowish-green, with black markings. Generally similar to alate female, but smaller, with more slender body and the dusky tubercular areas on dorsum of abdomen smaller. Cephalic and thoracic hairs simple or very faintly capitate and so may those be on the abdomen. Antennæ dusky to black, reaching a little beyond tip of body; iii. with 13 to 16 oval sensoria more or less in a row; iv. with 3 to 5; v. with 3 to 5 and the usual primary one. Rostrum not reaching second coxæ. Venation as in alate female. Cornicles and cauda dusky, the latter edged with black.

*Length* 1.3 mm.



*Oviparous female.* Apterous; yellowish-orange to orange when mature. Body usually yellowish when first reaching maturity, but as the ova, which are of an orange colour, begin to develop within the body they show through the skin and give a marked orange tint to the insect (in American specimens sent me by Prof. Davis the ova show as black bodies). Head and prothorax pale yellow; meso- and meta-thorax vary from yellow to orange. Dusky tuberculate areas conspicuous, these and the black capitate hairs arranged as in the apterous viviparous female. Antennæ not reaching base of cornicles; basal segments concolorous with head, others gradually darkening to apex. Legs pale yellowish; tarsi dusky; proximal half of hind tibiæ swollen and bearing 25 to 40 inconspicuous circular sensoria. Cornicles and cauda concolorous with body, often dusky at margins. Cauda knobbed; anal plate rounded at the tip, with no emargination.

*Length* 1.8 mm.

FOOD PLANTS. *Trifolium alexandrium*; *T. pratense*, etc.; *Ononis spinosus*; *Medicago sativa*.

LOCALITIES. Rothamsted (Rymer Roberts); Sandwich, Kent, 19 viii. 23; Wye, 17 vii. 25 (F. V. T.); Epsom; Lewes (Laing); Egypt (Willcocks); N. America (Monell, Davis, etc.); India (Das, etc.); Europe.

*Observations.* This appears to be rare in Great Britain. There is little doubt that Buckton's *Chaitophorus maculatus* from India is the same and also Monell's *Callipterus trifolii*. In America Davis records it from Red Clover (*Trifolium pratense*); White Clover (*Trifolium repens*); Alsike, English and Mammoth Clovers (*Trifolium spp.*). In India Das found that it lived on Lucerne, but not on *Trifolium*, just the reverse of what Davis found in America. I have not found it in Great Britain on *Medicago sativa*, only on *Ononis* and *Trifolium*.

THERIOAPHIS TILIÆ Linnæus.

*Aphis tiliæ* Linnæus.

*Callipterus tiliæ* Koch.

*Pterocallis tiliæ* Passerini.

*Eucallipterus tiliæ* Schouteden.

*Philyriptus* Amyot.

Linnaeus, Syst. Nat. Ed., 10, 452 (1758); Fn. Suecica, 984 (1789); Reaumur, Ins., III., pl. 23, fig. 8 (1737); DeGeer, Ins., III., 77, 12, pl. 5, figs. 1 to 6 (1769); Frisch, Ins. xi., 1. 3, pl. 17 (1750); Fabricius, Sp. Ins., II., 388-34 (1781); Mant., Ins., II., 316, 39 (1787); Syst. Rhyng, 299, 39 (1803); Schrank, Fn. Boica, II., 1, 117-122-3 (1801); Latreille, Gen., III., 173 (1803); Boyer, Ann. Soc. Ent. Fr., X., 182, 25 (1841); Curtis, Brit. Ent., 577 (1824-29); Mosley, Gard. Chron., I., 684 (1860); Kaltenbach, Mono. Pflanz., I., 129, 99 (1843); Ratzburg, Forst. Ins., III., 219, 22 (1844); Walker, Ann. Nat. Hist., Se. 2, 1, 331, 8 (1848); Walker, List. Homop. (B.M.), IV., 939, 8 (1852); Amyot, Ann. Soc. Ent. Fr., 2 me. Se. V., 479, 528 (1841); Koch, Die Pflanz., 209, figs. 282, 283 (1857); Passerini, Aphid. Ital., 61, 1 (1863); Ferrari, Aphid. Liguriæ, 77, 26 (1872); Buckton, Mono. Brit. Aphid., III., 34, pl. XCIII. (1880); Schouteden, Mém. Soc. Ent. Belg., XII., 210 (1906); Davis, Ann. Ent. Soc. Amer., II., 33 (1909); Davidson, Journ. Eco. Ent., III., 372 (1910); Essig., Pom. Journ. Ent., IV., 763 (1912); Swain, Univ. Calif. Publi., III., 1, 21, figs. 7, 30, 33, 42, 50 (1919).

*Alate viviparous female.* Bright citron yellow, pale yellow to deep yellow with prominent black markings as follows:—a large dark line each side of head and sometimes two small ones in between; a broader one each side of the large pronotum and each side of mesothorax; scutellum either all black or with a black patch each side; 5 to 7 pairs of large black abdominal patches and some small ones irregularly disposed and 4 black lateral spots. Antennæ black, with yellow bands. Legs yellow; hind femora black, except just at base; base of hind tibiæ black and apices, also apices of fore and mid pair; tarsi black. Wings deep brown along costa and stigma; deep brown stain at ends of veins. Cauda, anal plate and cornicles yellow. Antennæ longer than body; segment i. larger than ii.; both black; iii. nearly twice as long as iv., black, with pale yellow bands in middle, the black basal half with 13 to 17 oval sensoria; iv. longer than v., basal half yellow, apical black; v. with about two-thirds of apical area black; vi. longer than v., flagellum a little shorter than basal area, half yellow, half black. Cauda and anal plate yellow, with long pale hairs. Cornicles truncate, rather small. Rostrum very short, scarcely longer than head.

*Length* 2 to 2.9 mm.

*Apterous viviparous female.* Yellow to yellowish-green, oval. Head and pronotum with large black areas, also mesonotum. Abdomen with black paired median spots, in some almost converging into median bands and black lateral spots. Antennæ green to yellow, with black rings. Cauda, anal plate and cornicles yellowish-green. Legs same colour as body, with dusky apices to femora and tibiæ; tarsi dusky. Colour varies, some almost devoid of black markings, others show dorsal abdominal bands and others with a pale line separating these into spots. Antennæ less than to nearly as long as body; apices of segments iii. to vi. dusky; flagellum of vi. shorter than basal area.

*Length 2.4 to 2.6 mm.*

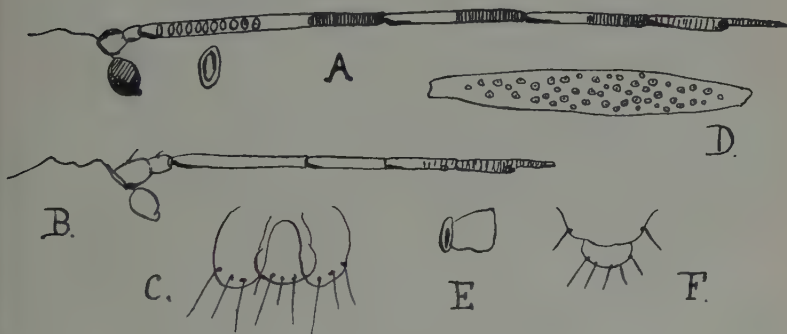


Fig. 168.—*Therioaphis tiliæ* Linnæus.

A. Antenna of alate ♀; B. of apterous ♀; C. Cauda and anal plate of alate ♀; E. Cornicle; F. Cauda of apterous oviparous ♀; D. Hind tibia, oviparous ♀.

*Oviparous female.* Apterous. Deep yellow to orange yellow. Head and pronotum deep brown, rest of thorax and abdomen with large paired central dark areas, the last four forming complete bars and with 8 large black lateral spots. Anal plate black. Cauda yellow. Cornicles dark. Antennæ shorter than body, yellow, apices of segments dark; i. and ii. dusky; iii. nearly twice as long as vi.; iv. and v. about equal; vi. longer than v., basal area longer than flagellum. Legs yellow, except tarsi, which are dusky and one side of apices of hind femora and base of the much thickened hind tibiæ, the latter with numerous sensoria. Anal plate dark. Cauda knob-like, pallid, with numerous long hairs.

Two marked pores at the base of the dark cornicles, which are constricted apically and which swell out at the mouth.

*Length* 1.8 mm.

*Male.* "Alate. Body small in proportion to the voluminous wings. Not unlike the female in colour. Head streaked with black. Antennæ very long and ringed; third joint tuberculate. Eyes bright red; stemmata prominent and green. Dorsum with two rows of black spots. Wings prettily clouded with grey" (Buckton). Walker states that this Aphid, like many others, has a supplementary wingless male.

*Length* 1.72 mm.

FOOD PLANTS. *Tilia platyphylla*, *T. rubra*, *T. grandiflora*, *T. cordata*, *T. vulgaris*, *T. americana*; *Acer pseudoplatanus*, *Corylus avellana*.

LOCALITIES. General over S.E., S., W. and Central England (F.V.T.); Northop, Flint, vii. 23 (Walton); Craiglockhart, Edinburgh, 15 vii. 22 (Evans); Scotland (MacDougall). Found practically wherever limes are found throughout the N.E. of Scotland (Laing).

*Observations.* This pretty Aphid frequently occurs in such vast numbers that the "honey-dew" falls down in a sticky mass below and in towns where Lindens are grown the pavements are often smothered with their excrement. On many occasions this Aphid occurs in such numbers that it causes the Lime trees to lose their foliage. The insects cluster on the undersides of the leaves, but the shiny and gummy honey dew falls on the upper surfaces and to this much black soot fungus adheres. Buckton says (p. 36) that in Switzerland these plant lice almost kill the trees and at times so exhaust them of sap, that Boussinghault calculated that a single sick tree may produce as much as three kilogrammes of sweet substance, which is entirely the produce of *Pterocallis tiliae* and elaborated from the juice.\*

The sexual forms occur in October and November and the ova are laid close to the buds. The eggs are at first yellow, but soon become shiny black.

\* Boussinghault. "On Honey Dew," Vol. I., p.42. Mono. Brit. Aphid., Buckton.

Buckton says (p. 36) that it is "largely destroyed by parasites (Hymenopterous)" and that "as many as 24 grubs may sometimes be counted infesting a single Aphis, but at other times one large maggot occupies almost the whole body cavity. So far I have failed to obtain a single parasite. I have taken casual alatae on Sycamore and some have been sent me from Hazel.

*THERIOAPHIS BETULICOLA* Kaltenbach.

*Aphis betulicola* Kaltenbach.

*Myzocallis betulicola* Schouteden.

*Kallistaphis betulicola* Kirkaldy.

*Tuberculatus betulicola* V. d. Goot.

*Callipterus betularius* Buckton (non Kalt.).

Kaltenbach, Mono. Pflanz., 1, 44 (1843); Buckton, Mono. Brit. Aphid., III., 15, pl. LXXXVIII., figs. 1-3 (1880); Walker, Ann. Mag. Nat. Hist., I., Se. 2, 5, 9, 333 (1848); Kirkaldy, Canad. Entomo., XXXVII., 417 (1905); Schouteden, Mem. Soc. Ent. Belg., XII., 211 (1906); Van der Goot, Tijds. v. Ent., LV., 118 (1913); Laing, Ent. Mo. Mag., LIX., 243 (1923).

*Alate viviparous female.* Bright green. Cornicles, cauda and anal plate green. Antennæ green, with brown apices to segments iii. to v.; vi. all dusky. Legs green, apices of femora and tibiae dark. Abdomen with small lateral tubercles. Abdomen and legs with hairs. Antennæ longer than body; segment i. much

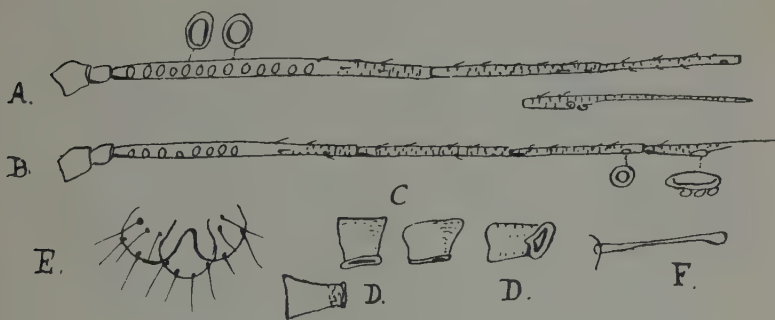


Fig. 169.—*Therioaphis betulicola* Kaltenbach.

A. Antenna of alate ♀; B. Antenna of apterous ♀; C. Cornicles of apterous ♀; D. of alate ♀; E. Cauda and anal plate; F. Hair.

larger than ii. ; iii. long, with 10 to 14 oval sensoria over basal two-thirds. Cauda knobbed ; anal plate bifid, both with long hairs. Cornicles short and truncate, rather thick. Some of the body hairs capitate. Rostrum pale, apex dark.

*Length* 1.8 to 2.8 mm.

*Apterous viviparous female.* Green, with ochreous markings, shiny, with distinct tubercles, which bear hairs, also hairs on the head ; hairs capitate. Antennæ green with dark bands, longer than body. Cornicles, cauda and anal plate green. Segment i. of antennæ larger than ii. ; iii. much longer than iv., with 7 to 9 oval sensoria on basal half ; iv. longer than v. Primary sensorium on vi. oval.

*Length* 2.2 to 3 mm.

*Oviparous female.* "Apterous. Long, fusiform. Amber-brown to deep brown, with rusty brown cross bars ; 3rd to 6th of these with round whitish tubercles. Antennæ and legs stout, long, green. Tarsi dark brown. Eyes red. Length 4 mm." ? (Buckton).

FOOD PLANT. *Betula alba*.

LOCALITIES. Critchmere and other localities near Haslemere (Buckton) ; Southgate (Walker) ; Wimbledon (Laing) ; Pluckley, Kent, vi. 26 (F.V.T.).

*Observations.* This appears to be an uncommon species. Buckton's slide of *betularius* in the British Museum is this species and his specimens of *betulicola* are *Eucерaphis betulæ*.

Genus EUCERAPHIS Walker.

*Callipteroides* Mordwilko and V. d. Goot.

Walker, Zoologist, V., 2001 (1870) ; Mordwilko, Ann. Mus. Zool. Acad. Imp. d. Se. St. Petersburg, XIII., 377 (1908) ; V. d. Goot, Tijds. v. Ent., LVI., 151 (1913) ; Essig, Pomona, Journ. Ent., IV., 3, 761 (1912) ; Baker, Bull. 826, U.S. Dept. Agri., 28 (1920).

Cornicles small, truncate. Antennæ long, slender, of 6 segments, with narrow oval sensoria near base of segment iii. in viviparæ ; flagellum not much longer than basal area of vi. ; sensorium at base of flagellum long and oval ; small frontal tubercles present. Cauda knobbed and large. Anal plate entire.



Wax glands often present. Mostly very large species, solitary in habits, but in our species as many as thirty can be found on one leaf.

Walker erected this genus for Linnæus' *Aphis betulæ*, which seems to be the same as Heyden's *nigritarsis*. Upon the latter Mordwilko created the genus *Callipteroides*. In 1913 Van der Goot made Koch's *betulæ* type of the same genus, but the latter has been accepted by most authorities as being the same as Linnæus' species. Walker's *A. comes* probably comes in this genus; no type of it is known to exist.

#### EUCERAPHIS BETULÆ Linnæus.

*Aphis betulæ* Linnæus.

*Aphis nigritarsis* Heyden.

*Aphis betulicola* Buckton (non Kalt.).

Linnæus, Syst. Nat., 452 (1758); Fabricius, Ent. Syst., 4, 216, 25 (1794); Schrank, Fn. Boica, II., 107, 1189 (1801); Heyden, Mus. Senk., II., 3, 299 (1837); Buckton, Mono. Brit. Aphid., III., 15, pl. LXXXVII., figs. 1-3 (1880).

*Alate viviparous female.* Yellowish-green to almost yellow; head marked with darker green. Thorax with brown lobes, reddish-brown in some. Abdomen with lateral dark green spots and some darker bands and covered with short hairs. Cornicles very short; green or yellowish-green, apices dusky, in some almost white. Cauda knob-shaped, greenish, about as long as cornicles. Anal plate green. Legs green, apices of femora and tibiæ and the tarsi black, rather long. Antennæ longer than body. Costa yellowish; stigma dusky; veins pale to deep brown. Segment i. of antennæ larger than ii.; iii. the longest, nearly as long as iv. + v., basal region slightly thickened, with 22 to 27 narrow sensoria, extending to rather more than one-third of length; iv. slightly longer than v.; vi. about two-thirds of v., basal area a little longer than flagellum; in some the antennæ are all brown, in others the greater part of iii. and base of iv. paler. Head with distinct lateral processes and 2 small dark tubercles between, from each of which arises a small hair. In many there are 2 broad dark bands on the hinder part of abdomen and the scutellum is very dark. The knob-shaped cauda has some long hairs and in some is dark green. Anal plate rounded, with a few long and some

short hairs. Cornicles short, expanded basally and to some extent at apices. Tibiæ hairy, especially at apices; hairs rather short.

Length 3.9 to 4 mm.

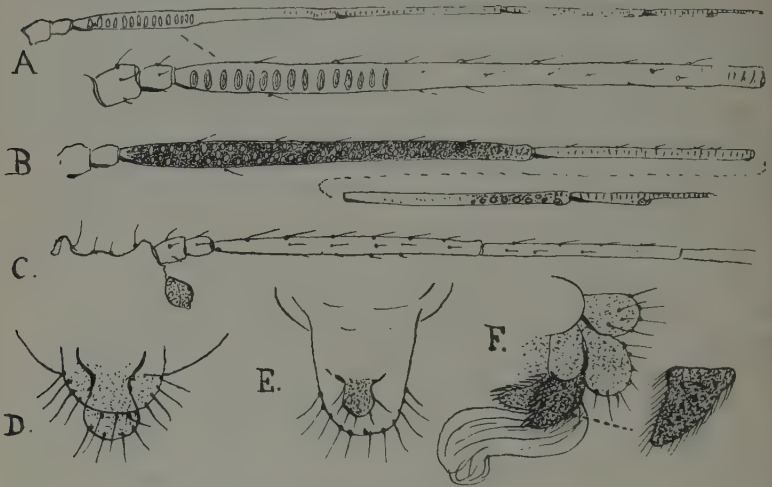


Fig. 170.—*Euceraphis betulae* Kaltenbach.

A. Antenna of alate ♀. B. of male; C. of oviparous ♀; D. Cauda and anal plate of A.; E. of oviparous ♀; F. Genitalia of ♂.

*Male.* Alate. Green; head black; thoracic lobes black, also scutellum, bands on body, claspers and small ventral plates. Antennæ dark brown. Legs brown, apical half of tibiæ and the tarsi black. Rostrum green, banded with brown. Wings with brown stigma, veins and costa; insertions green to yellow. Antennæ longer than body; segment i. larger than ii., iii. longest with many yellow sensoria over its whole length; iv. more than half of iii.; v. shorter than iv., with 8 to 10 sensoria on apical half; vi. more than half of v., base a little longer than flagellum. Cornicles dark, striate. Cauda knobbed, dark green, with some long hairs. Penis yellow, large. Claspers dark, acuminate, spiny, with dense short hairs.

Length 3 mm.

*Oviparous female.* Apterous. Elongate, green. Antennæ, apices of tibiæ and the tarsi brown. Cornicles dusky. Apex of

body bluntly elongate. Cauda bluntly rounded, approaching knob-shape. Anal plate rounded. Antennæ not quite so long as body; segment i. much longer than ii.; iii. longest, no sensoria; iv. about three-quarters of iii.; v. a little shorter than iv.; vi. about three-quarters of v., basal area a little longer than flagellum, sensorium elongate, with marked fringe; a few hairs

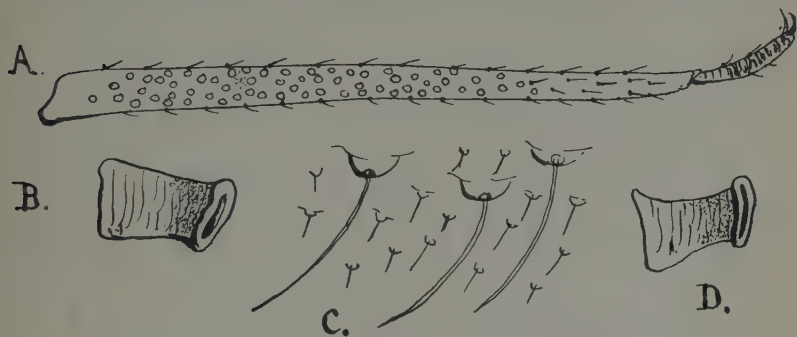


Fig. 171.—*Euceraphis betulæ* Linnæus.

A. Leg of oviparous ♀; B. Cornicle; C. Skin; D. Cornicle of alate ♀.

on segments and on head. Rostrum dark at apex, reaching nearly to second coxæ. Cornicles markedly expanded at apex. Hind tibiæ not enlarged, long, hairy, with many small pale sensoria on basal two-thirds. A few rather long hairs on body, arising from marked tubercles.

*Length* 4 mm.

**FOOD PLANT.** *Betula alba*.

**LOCALITIES.** Wye; Shadoxhurst; Blean; Goudhurst in Kent; Hastings, Battle, Ewhurst, Rudgewick, Sussex; Boxmoor; Brockenhurst; Esher; Godalming (F.V.T.); Camberley (Green); Great Salkeld (Britten); Ogwen River, near Bangor, North Wales, 5 vi. 22 (Walton); Wimbledon Common; Midhurst; New Forest; Oxshott; Woking; Bagshott; Lynmouth; along the Chilterns; Birmingham district; Halifax; Aberdeenshire; Argyllshire (Laing).

**Observations.** A very common insect where it occurs. They are very active. The alatæ are solitary, but the nymphæ often occur several together under a leaf. The sexuales I have found in

numbers as late as November. The eggs are laid on the leaves as well as on the shoots. Apterous viviparæ are not known.

Genus SYMYDOBIUS\* Mordwilko.

*Yezocallis* Matsumura.

Mordwilko, Varshara, Universitetsküa Izvestiia, VIII., 58, 65 (1894); Matsumura, Journ. Coll. Agri. Tohoku Univ., VII., pt. 6, 369 (1917); Baker, Bull. 826, U.S. Dept. Agri., 30 (1920).

Cornicles small, truncate, on a broad basal area. Antennæ of 6 segments, with many hairs; sensoria oval or circular; sensorium at base of flagellum not long and narrow. Cauda semicircular. Anal plate semicircular, rarely indented. Wings normal.

*Type Aphis oblongus* Heyden.

One species only known in Great Britain.

SYMYDOBIUS OBLONGUS Heyden.

*Aphis oblongus* Heyden.

Heyden, Mus. Senck., II., 298 (1837); Kaltenbach, Mono. Pflanz., 133, 101 (1843); Jackson, Scot. Nat., 54 (1922); Laing, Ent. Mo. Mag., IX., 245 (1923).

*Alate viviparous female.* Head brown. Thorax darker brown. Abdomen brownish-green to brown, with paler incisions, paler apex and darker lateral spots. Antennæ dark brown, basal segments and sometimes the last paler, dull yellow. Legs dark brown. Eyes reddish-black. Rostrum dark brown. Antennæ of 6 segments, nearly to quite as long as body. Head, body and legs hairy. Antennæ with short hairs. Cauda and anal plate rounded, in some the latter more conical, both hairy. Segment i. of antennæ larger than ii.; iii. much the longest, not quite so long as iv. + v. + vi., with 18 to 28 narrow sensoria over basal two-thirds, when seen laterally giving a saw-like appearance; iv. about half as long as iii.; v. nearly as long as iv.; vi. half as long as v.; flagellum shorter than basal area; primary sensorium rounded, with slight fringe. Rostrum not reaching second coxæ. Cornicles very short, cylindrical, yellow to brown. Wings large; venation normal; insertions yellow; stigma blackish-brown;

\* Frequently spelt *Symdobius*.

costa paler, almost yellow; dusky brown spots at junction of veins with border and in some slight duskiness each side of veins.

*Length 2.5 to 2.8 mm.*

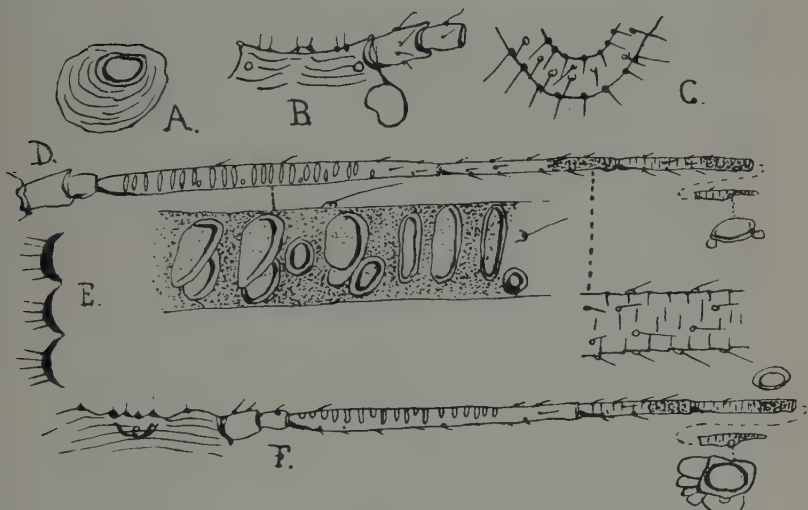


Fig. 172.—*Symydobius oblongus* Heyden.

A. Cornicle of apterous ♀; B. Head; C. Cauda and anal plate; D. Antenna; E. Lateral body hairs; F. Antenna of alate ♀ (lateral view).

*Apterous viviparous female.* Dark brown to deep greenish-brown, rather shiny, with darker transverse bars and lateral spots; more or less elongate oval. Head and prothorax large. Antennæ brown, shorter than body, of six segments. Cauda and anal plate more or less rounded, dark. Legs brown, long, hairy, head and body with short hairs. Segment i. of antennæ larger than ii. and darker; iii. long, not quite so long as iv. + v. + vi., with 24 to 26 narrow oval sensoria on basal  $\frac{3}{4}$ ths; iv. not quite half of iii., pale at base; v. about same length as iv.; vi. about half of v., the short blunt flagellum not so long as basal area; antennal hairs short.

*Length 2 mm.*

*Autumnal viviparous female.* Dark, shiny brown, with darker cross bars and lateral spots. Antennæ not quite so long as body, brown, basal areas of iv. to vi. paler and in some a paler area

towards apex of iii. Fore and mid legs pale brown; hind dark brown; apices of tibiæ and tarsi darker. Body, antennæ and legs with short hairs. Segment i. of antennæ larger than ii.; iii. much longer than iv., not quite so long as iv. + v. + vi., with 26 to 28 narrow sensoria over nearly two-thirds of length; iv. not quite half of iii.; v. a little shorter than iv.; vi. about half of v., basal area a little longer than flagellum. Head broad, striate. A small papilla cephalad on meso-thorax. Anal plate and cauda rounded, minutely spinose and with hairs much longer than on body.

Length 2 to 2.5 mm.

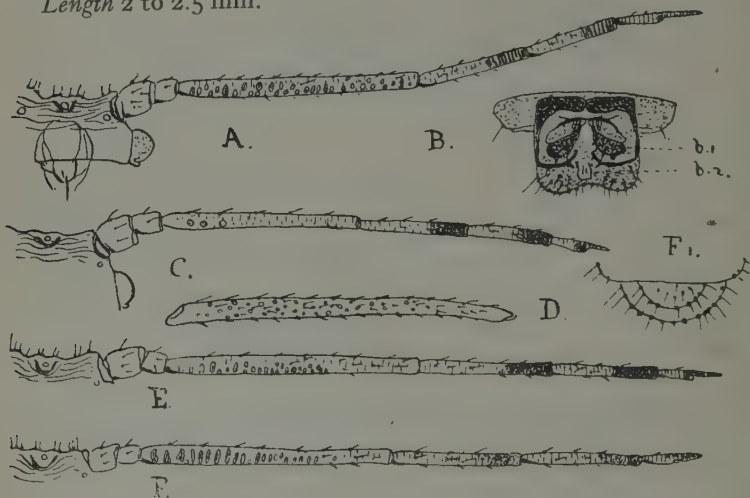


Fig. 173.—*Symydobius oblongus* Heyden.

A. Head and antenna of ♂; B. Sexual organs of ♂; b<sup>1</sup> claspers; b<sup>2</sup> penis; C. Oviparous ♀; D. Hind tibia of same; E. and F. Antennæ of alate ♀; F<sup>1</sup>. Cauda and anal plate.

*Oviparous female.* Apterous; dark brown, shiny, ground colour paler brown. Thorax dark brown. Abdomen with dark brown transverse bars and a row of dark spots on each side. Colour variable, in some the dark bars are scarcely noticeable, owing to the ground colour being dark, others have lighter areas on the body. Eyes red. Antennæ not so long as body, rather thick. Segments i. to iii. deep brown and apices of iv. to vi.; iii. longest, not quite so long as iv. + v. + vi., with 5 to 11 small round sensoria on basal half and a few short hairs; iv. less than half of



iii. ; v. a little shorter than iv. ; vi. more than half of v., flagellum shorter than base ; primary sensorium large, irregularly rounded ; imbrications dense on iii. Rostrum reaches just past second coxæ. Fore and mid legs light brown ; hind all dark brown ; posterior tibiæ long, not enlarged with many round pale sensoria over three-quarters of length and a few scattered ones towards apex. Body with many fine, short hairs, arising from tubercles. Anal plate and cauda dark, hairy. Rostrum hairy.

*Length* 2 to 2.3 mm.

*Male.* Apterous. Slightly smaller and more elongate than female, dark transverse bands on abdomen, but narrower than in apterous female. Antennæ nearly as long as body ; segment i. much larger than ii. ; iii. longest, nearly as long as iv. + v. + vi., with 33 to 38 oval sensoria over whole length ; all the segments brown ; iv. about one-third of iii., base yellow ; v. about same length as iv., basal half yellow ; vi. shorter than v., flagellum a little shorter than base. Rostrum reaching to third coxæ. Legs rather long, brown, fore and mid pair paler ; apices of tibiæ and tarsi dark. Sexual appendages dark ; penis small and blunt ; claspers dark and spinose.

*Length* 1.8 to 2 mm.

FOOD PLANTS. *Betula alba* ; *Pinus sylvestris* (?).

LOCALITIES. Chandler's Ford, New Forest, 26 vii. 12 (Duffield) ; Lyndhurst Road Station, New Forest, viii. 22 (Laing) ; Oxshott, Surrey, on Scots Pines, vi. 22 (Coll. C. L. Withycombe) ; Romsey, southwards in Hampshire, attended by ants (*Formica rufa*) Laing (Ent. Mo. Mag., lix. 23) ; Inveran, Invershin, N.B., 6 ix. 20 (D. J. Jackson) ; Shadoxhurst, Kent, viii. 25 (F.V.T.). Belgium, Germany.

*Observations.* This insect clusters on the twigs of the Birch, especially on the lower branches. Its brown colour makes it very inconspicuous : except for the fact that it is largely attended by ants it would easily pass unobserved. The large Red Wood Ant (*Formica rufa*) is one of its chief associates. At Inveran, Miss D. J. Jackson found that the aphides always occurred on the Birch trees near an ant's nest. It is subject to some variation in colour and markings. The small cornicles may for instance be yellow, white or green. Frequently the oviparous female has a patch of white tomentum at the apex of the body.

## Genus CALAPHIS Walsh.

*Siphonocallis* Del Guercio.*Callipterinella* V. d. Goot.

Walsh, Proc. Ent. Soc. Phil., I., 301 (1863); Del Guercio, Redia, ix. 293 (1913); V. der Goot, Tijdschr. v. Ent., 56, 118 (1913); Essig, Pomona, Coll. Journ., III., 3, 760 (1912); Baker, Bull. 826, U.S. Dep. Agri. Ent., 26, pl. IV. (1920).

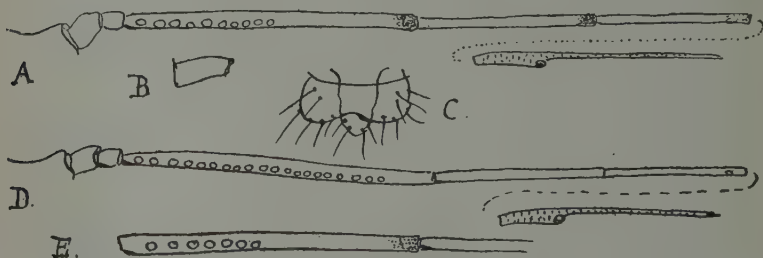
Cornicles present, truncate. Antennal sensoria round or slightly oval; antennæ placed on more or less distinct tubercles. Cauda knobbed. Anal plate indented. Body with prominent hairs. Fore wings with media twice branched, the radial sector either absent or faintly indicated, sometimes complete; hind wings with both media and cubitus. Oviparæ with antennal sensoria and produce several ova. More or less living solitary on foliage. Type *betulella* Walsh. The type of *Siphonocallis* is *betulicolens*, which is closely allied to *betulella*. The type of *Callipterinella* is *betularius*, also closely related.

## CALAPHIS ANNULATA Koch.

*Chaitophorus annulatus* Koch.

Die Pflanzenläuse, 7, figs. 10 and 11 (1854); Laing, Ent. Mo. Mag., LIX., 243 (1923); V. d. Goot, Beit. z. Kennt. d. Holland, Blattlause, 290 (1915).

*Alate viviparous female*. Brownish-yellow, darker at sides and with darker cross bars, antennæ and legs same colour as body with dark areas; body, legs and antennæ hairy. Segment i. much larger than ii.; iii. long, with 10 round sensoria on basal

Fig. 174.—*Calaphis annulata* Koch.

A. Antenna of alate ♀; B. Cornicle; C. Cauda and anal plate; D. Male antenna; E. Variation of A. (Laing).

half ; iv. a little longer than v. ; flagellum more than three times as long as base. Cauda and anal plate hairy, anal plate indented. Cornicles short, cylindrical.

*Apterous viviparous female.* Dark brown to black, with yellow transverse lines, or all shiny black, whole insect hairy. Segment iii. of antennæ with 6 to 8 round sensoria on basal half.

*Male.* Alate. Darker than alate female ; head and thorax brown, a row of dark spots along dorsum of abdomen. Antennæ much larger than body ; segment i. larger than ii. ; iii. long with 20 to 24 uneven sized round sensoria on one side, extending nearly to apex. Legs long ; tibiæ hairy. Penis pale. Claspers dark. Apex hairy.

*Length* 2 to 2.5 mm.

FOOD PLANTS. *Betula pubescens* and *B. alba*.

LOCALITY. Richmond Park, viii. 20 (Laing).

*Observations.* The only British record is Mr. F. Laing's, the specimens he found were entirely black and slightly shiny, but structurally they appear to be identical with *C. annulata*. He says the differences between this species and *betularius* apart from colour, in the alate female are the smaller number of sensoria on iii., the presence of transverse bands on the abdomen, the distinct radial sector and the very faint borders to the veins of the front wings.

### Sub-tribe DREPANOSIPHINA.

This sub-tribe can at once be told by the greatly enlarged cornicles. This character does not apply, however, to all extra-British species, for they vary from rather small to very large, but all have the same general characters :—Cornicles always present, although varying in size ; cauda knobbed ; anal plate slightly indented. Oviparous female with a long drawn out ovipositor.

Only one genus occurs in Britain namely *Drepanosiphum* of Koch, which has previously been wrongly included with *Macrosiphum*. The knobbed cauda places it in this sub-tribe.

### Genus DREPANOSIPHUM Koch.

Koch, Die Pflanz., 201 (1857) ; Buckton, Mono. Brit. Aphid., I., 182 (1875) ; Lichtenstein, Mono. d. Aphidiens, 75 (1885) ; Baker,

Bull. 826, U.S.A. Dept. Agri., 32 (1920) ; Essig, Pom. Journ. Ent., IV., 3, 759 (1912).

Antennæ long, longer than body in alatae, arising from small frontal tubercles, of 6 segments, with short hairs and oval sensoria in alate females, rounded in males. Cornicles very long and thick, widely divergent and more or less swollen in the middle, in some stages sub-cylindrical. Cauda rather small, knobbed. Anal plate slightly indented. Oviparous female with elongated large blunt ovipositor. Male genitalia prominent. Wings large, fore pair with media twice branched ; hind with media and cubitus present. Legs long and thin even the hind tibiæ of the oviparous female.

The genus is also marked in that the apteræ do not seem to produce any living young. I have always failed to find any thus endorsing Walker's and Gillander's statements.

Four European species are known, namely :—

*Drepanosiphum platanoides* Schrank.

*Drepanosiphum acerina* Walker = *D. aceris* Koch. \*

*Drepanosiphum tiliæ* Koch.

*Drepanosiphum smaragdinum* Koch.

The first two only are known in Great Britain.

#### FOOD PLANTS.

<i>Acer campestre</i>	<i>D. platanoides</i> and <i>acerina</i> .
<i>Acer pseudo-platanus</i>	<i>D. platanoides</i> and <i>acerina</i> .
<i>Acer platanoides</i>	<i>D. platanoides</i> .
<i>Populus italicus</i>	<i>D. smaragdinum</i> * and <i>tiliæ</i> .
<i>Tilia grandiflora</i>	<i>D. tiliæ</i> * and <i>platanoides</i> .
<i>Tussilago farfara</i>	<i>D. platanoides</i> .

#### DREPANOSIPHUM PLATANOIDES Schrank.

*Aphis platanoides* Schrank.

*Aphis pseudo-platani* Mosley.

*Siphonophora platanoides* Passerini.

Schrank, Fn. Boica, II., 1, 112 (1801) ; Kaltenbach, Mono. Pflanz., II., 11 (1843) ; Ratzeburg, Forst. Ins., III., 216, pl. XI., fig. 4 (1844) ; Hartig, Germ. Zeit., III., 369 (1841) ; Walker, Ann. Mag. Nat. Hist., Se. 2, I., 250-254 (1848) ; Mosley, Gard. Chron., I., 684 (1860) ; Walker, List. Homop. (B.M.), IV., 934,

\* Non British.

1 (1852) ; Buckton, Mono. Brit. Aphid., I., 183-185, pl. XXXVI. (1875) ; Schouteden, Mem. Soc. Ent. Belg., XII., 237 (1906) ; Gillanders, Forst. Ent., 298 (1908) ; Wilson, Journ. Eco. Ent., II., 349 (1909) ; Davidson, Journ. Eco. Ent., III., 377 (1910) ; Essig, Pomona Journ. Ent., IV., 759 (1912) ; Swain, Univ. Calif. Publ., III., 1, 17, figs. 21, 24, 26 (1919).

*Alate viviparous female.* Variable in colour, but mainly shades of green ; head and pronotum with 2 acuminate converging dark lines or dark in the middle ; thoracic lobes brown to black ; scutellum black. Abdomen with 5 to 6 black transverse median bars on the segments and a black spot at base of each cornicle and 3 other dark lateral spots. Antennæ as long or longer than body ; pale greenish brown in immature specimens to brownish-black arising from small frontal tubercles ; flagellum pale ; segment i. longer and wider than ii., with a median circle of hairs ; iii. longer than iv., with 16 to 19 rather elongate transverse sensoria, reaching half along the segment ; iv. longer than v., latter with a marked sub-apical sensorium ; vi. longer than v., variable in length, with marked sensoria between flagellum and basal area. Head with a line of 5 hairs on each side in a line,

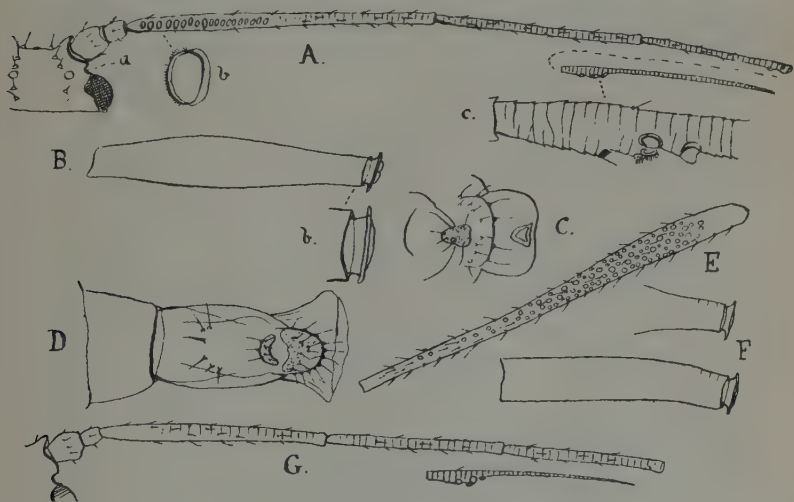


Fig. 175.—*Drepanosiphum platanoides* Schrank.

A. Head and antenna of alate ♀ ; c. Base of segment vi. enlarged ; B. Cornicle ; b. apex of B. ; C. Apex of alate ♀ ; D. Apex of oviparous ♀ ; E. Hind tibia ; F. Cornicle ; G. Antenna of apterous ♀.

with the lateral ocelli. Eyes large, golden-green when alive, deep red in balsam preparations. Cauda small, green, of curious form (vide Fig. 171 C.). Cornicles rather large, to some extent swollen in varied manner; green, usually dusky at apices, where there is a marked constriction (Fig. 171 B). Rostrum short, not or only just reaching second coxæ, yellow-green, apex dusky; rather broad, last 2 segments nearly same length; base brown. Legs from yellow-green to brown-green; tarsi dusky; in some apices of tibiæ and rarely femora dusky; hind legs long and slender; all the legs slightly hairy. Wings much longer than body; insertions green to yellow; veins brownish.

*Length* 3 to 4 mm.

A great number of varieties occur, some are pale yellow, others have a row of transverse black spots along the dorsum of abdomen and pale yellow legs; apices of all segments black; tarsi black. Often the antennæ are bluish-black, with a white bloom; in some the body is tinged with brick dust red and some with bright red, especially in autumn. Now and then the head and thoracic markings are red, green, lilac or grey. Even almost black specimens may occur and may have a distinctly mealy bloom. Specimens from the north show the basal half of antennal segment iii. green; ii. dark; i. green. The abdominal bars may be broken laterally and very faint traces of lateral spots seen, except at base of cornicles.

*Larval stage.* The young are slender and pale green; hairy; with 4 rows of black dots; 2 rows of small projections, separated by 3 rows of small tubercles and now and then there may be green stripes on the body. Antennæ usually longer than body; apices of segments dusky; segment i. larger than ii.; iii. a little longer than iv.; iv. longer than v. Eyes dark. Rostrum rather short, only just reaching second coxæ, green, apex black. Cornicles green, rather short, constricted at apices, as in alate female. Legs green, tarsi often dusky. Hairs capitate. As the insect grows the hairiness decreases and the capitate hairs disappear. Some are almost translucent white, others yellow or greenish-white, now and then dark green; reddish or almost black; many have 2 bright green stripes along the back. They gradually grow up to the nymph stage, which is yellow with green dorsal lines or now and then vivid green. Antennæ long, segments



tipped with brown or black. Wing pads white to pale-yellowish-green.

*Oviparous female.* Apterous, long and oval, the last 3 abdominal segments drawn out and expanded into an ovipositor; yellow with two bright green lines on the back and with vertex, thorax and transverse bars black or brown on dorsum and irregular dark areas or spots at the sides and others behind. Some are almost all dark brown to black, others pale orange, now and then with a pinkish-tinge. Eyes bright red and separated from antennæ by a distinct notch. Antennæ as long as or slightly longer than body; segment ii. smaller than i.; iii. a little longer than iv.; iv. nearly equal to v.; vi. with marked sensoria. Legs green to yellow; with dark femoral and tibial apices; tarsi dark; in some femora all green; hairy; hind tibiæ long, not much expanded, with numerous small sensoria nearly up to apices and hairs scattered amongst them; apical half brown. Cornicles green, with dusky apices, of similar form to alate female, but not quite so swollen and not so large; some of almost normal form. Ovipositor very marked and much protruded. The number of dark abdominal bars varies from 5 to 6. Antennæ brownish.

Length 3 to 3.8 mm.

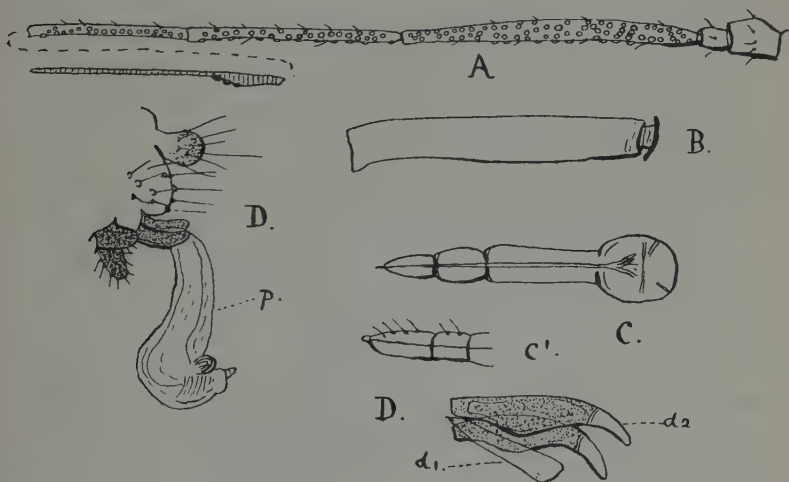


Fig. 176.—*Drepanosiphum platanoides* Schrank.

A. Antenna of ♂; B. Cornicle; C. Rostrum; C'. Apex of C.; D. Anal region of ♂; *p.* penis; D. Ungues *d*<sub>2</sub>; *d*<sub>1</sub> pulvillæ.

*Male.* Alate. Greenish-yellow to brownish-yellow; head and thorax brown. Abdomen brownish to brownish-green in middle, with a broad pale green stripe on each side; in some with a grey tinge. The dark median area is made up of 6 large and confluent black transverse bars, similar to the alate female, only fused, each with 2 pairs of hairs, arising from pale tubercles; there are also 4 bars of dark lateral spots, the caudad ones being very dark and also at base of cornicles. Antennæ longer than body; segment i. much larger than ii.; iii. much longer than iv. and wider, many sensoria all over it; iv. longer than v. with many sensoria all over it, but not so dense as in iii.; v. with a line of sensoria along its whole length, mainly on one side; vi. longer than v. Antennæ dark brown, the sensoria showing as pale spots. Cornicles green, apices dusky, constricted at tips, slightly swollen; basal black spot more defined in some than others. Penis strongly projecting and large, of marked form, pale; claspers dark, spinose. Legs deep green to brownish-green or even pale green; femora dark on apical half, most so in mid legs; in some more so than in others; apices of tibiæ and tarsi dark.

*Length* 3 to 3.5 mm.

*FOOD PLANTS.* *Acer platanoides*; *A. campestre*; and *A. pseudo-platanus*. Alate females were found on Lime and Coltsfoot by Dr. MacDougall, evidently vagrants.

*LOCALITIES.* Common all over Britain, where the food plants occur. Belgium (Schouteden); Italy (Passerini); Rouen, France (F.V.T.); Germany (Kaltenbach, Koch, etc.); California, U.S.A. (Wilson), etc.

*Observations.* This is one of the few Aphides which does not appear to have a viviparous apterous generation. The young gradually grow into nymphæ and then viviparous alate females and these produce another brood. The ova are laid early in November, and I found them at Wye still being laid up to December 12th in 1906. The oviparous female which occurs from October onwards, lays her eggs on the buds and shoots, but more often on the bark and they are at first pale brownish-green, later they become shiny black. They are large for Aphid eggs. The female deposits them very slowly; some under observation laid only 10 in two weeks. When laid on various lichens on the bark they are very noticeable. The males occur at the same time as the

apterous oviparous females, but die off by the end of October as a rule, although I have found a few as late as November 20th. The ova hatch in late February up to the end of March, a few remaining on into April when the weather is cold. The young are found just as the buds are bursting and are green, with small body, long legs and antennæ and red eyes. The larvæ by repeated ecdyses grow into the nymphs, but do not reproduce. The alate females first come from the nymphæ according to Walker and Gillanders, soon after the middle of April. I have not yet found them until mid May and then only in small numbers. These alatae which seem never common in spring and early summer produce living young in fair numbers and more alate females arise in July and by late August and September or even October the alatae increase, until they may often be shaken down from the trees in showers. The larvæ and pupæ live in small groups; usually in twos and threes and frequently occur with *Periphyllus aceris*, etc. The alatae fly readily and occur under the leaves and they are constantly moving about, but now and then they remain sedentary. Much honey-dew is excreted by them and the foliage becomes covered by it and then the black soot-fungus appears. In October they may be seen on a fine day, especially towards sunset, hovering around the trees and they continue along with the sexuparæ producing their living young most of which die, falling with the leaves, but so long as any leaves hang on the trees I have found some alatae. The sexual females, as the leaves fall, wander to the shoots and trunks of the trees and there deposit their eggs. Frost does not seem to affect them. This insect is subject to considerable colour variation in all stages. Walker gives 10 varieties, many more could be added. In all I have seen the flagellum is markedly pale.

Specimens from Scotland sent me by Dr. MacDougall found on Lime and Coltsfoot were evidently vagrants.

*Natural Enemies.* Several Hymenopterous insects attack this Aphis, including:—*Aphidius constrictus*, *Megaspilus carpenteri*; *Asaphes ænea*; *Cyrtogaster vulgaris*; *Coryna clavata*; and *Encyrtus atheas*. Numerous Coccinellids devour them, including *Adalia bipunctata*, *Coccinella 7-punctata*. Also many Syrphid larvæ. Walker mentions the larvæ of the Lace Wing Flies (*Hemerobiidæ*) as preying on them. I have observed that

some *Crabronidæ* collect numbers to provision their nests. Mr. Blakey has also observed Hemiptera destroying them. Numbers may also be found in the Chaffinch. In spite of the numerous natural enemies it sometimes increases to such an extent that the Sycamore and Maple foliage is ruined by the honey-dew in late summer. In 1910 I found on one tree no less than 70 per cent. parasitised, both viviparous and oviparous females. In spite of this it was most abundant in 1911 and 1912 at Wye, more so than I can remember since 1889. Gillanders says, "About the middle of April, just before the winged insects appear, large apterous specimens, very much larger than the general larvæ and of a mahogany colour, may be found. Contrasting with the larvæ just referred to, it may be observed that in proportion to the size of the body, the antennæ, tail and cornicles are all comparatively short. Abdomen large, warty and bristly. At first sight this insect may be mistaken for the stem mother, or for some other species, but if kept in confinement for a few days it will be found to be a bloated parasitised form, whence parasites are hatched."

DREPANOSIPHUM ACERINA Walker.

*Aphis acerina* Walker.

*Drepanosiphum aceris* Koch.

Walker, Ann. Mag. Nat. Hist., I., Se. 2, 254 (1848); Koch, Die Pflanz., 202, pl. XXXVIII., fig. 276 (1857); Buckton, Mono. Brit. Aphid, I., 185, pl. XXXVII., figs. 1-3 (1875); Schouteden, Mém. Soc. Ent. Belg., XII., 237 (1906); Theobald, Entomologist, LX., 77 (1917).

*Alate viviparous female.* Bright lemon to orange-yellow head and thorax, a narrow black band behind the head; thoracic lobes and scutum brown; sides pale brown. Abdomen bright yellowish-green, with 4 black median bars before cornicles, the 2 nearest latter largest and 3 smaller ones behind them; some show only 2 dark bands and 2 dark spots of same colour between the last band and the cornicles. Antennæ yellow, with tips of segments iii. to v. black; vi. all black; in some the whole antennæ, except base of iii. are black; i. much larger than ii.; iii. very long, with 12 to 14 oval sensoria (one pair being round as shown in figure) extending about half length of segment; iv. shorter than iii.; v. a little shorter than iv.; cornicles dusky orange yellow, with dark apex or all brown, about quarter length of body, somewhat

swollen in middle and with a marked apical stria ; at base of each a small dark spot. Metasternal plate deep brown ; venter of abdomen green, with 3 black bars close together cephalad and 2 smaller ones behind. Rostrum pale yellow, apex brown, reaching to second coxæ. Legs long and thin ; ochreous yellow, apices of femora and tibiæ and the tarsi brown (Walker says, "fore thighs and hind thighs shaded with brown ; apices of legs black ; but in some the legs are all yellow, except base and apex of tibiæ and the tarsi.") Wings long, veins dull yellowish ; stigma pale, excepting a long costal border. Each fore femur has a more or less pronounced projection at apex on inner side (Walker describes it as "a very slight tooth on the inner side of its tip.")

*Length* 2.8 to 3 mm.

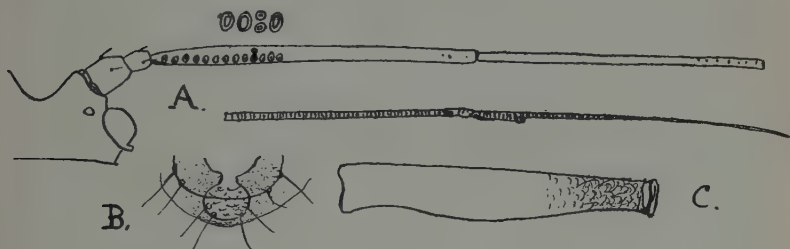


Fig. 177.—*Drepanosiphum acerina* Walker.

A. Head and antenna of alate ♀ ; B. Cauda and anal plate ; C. Cornicle.

*Oviparous female.* Apterus. Walker's description is as follows :—" This is spindle shaped and in form much resembles the oviparous *A. platanooides* ; it occurs from the beginning till the end of October. Its colour is buff or yellowish ; the tips of the joints of the feelers, the tip of the mouth, the lobes of the chest, the tips of the nectaries, the knees and the feet are brown ; there are also five or six interrupted brown bands across the abdomen, increasing in distinctness till the last, which is usually entire, the eyes are dark red. 1st variety—the tips of the joints of the feelers, the knees and the feet are black."

*Male.* Alate. " Much resembles the winged female, but is somewhat darker, it pairs with the oviparous female before the end of October. *Length* of body  $1\frac{1}{2}$  lines, of the wings 3 lines" (Walker).

## FOOD PLANTS. Sycamore and Maple.

LOCALITIES. Near London (Walker, 1847); Walthamstow (Buckton-Walker); Rothamsted, 23 vii. 16 (Rymer Roberts); Godmersham, near Wye, vi. 26 (F.V.T.); Croxley Green, Bucks. (Laing).

*Observations.* I have only seen a few alate viviparous females of this species and so record Walker's description of the male and oviparous female. Walker found it feeding on the leaves of young Sycamores that were about 5 feet high and were situated a mile apart from each other, one in a garden, the other in a wood.

It is a lively, active and very pretty species when alive. There is some variation in the dark bars on the abdomen. Koch's *Drepanosiphum aceris* is no doubt the same as Walker's insect. Schouteden records it from Belgium on *Acer pseudo-platanus*.

Buckton evidently redescribed Walker's species for they were obtained by him from Walker as alatae, but apparently taken by Buckton as apterae from the same locality in November! It is probable that this was only Walker's oviparous female found in October, however I append Buckton's description; "Bright orange, with redder sides. Body deeply segmented and carinated. Head very broad. Eyes red. Front convex. Antennae long and the joints tipped with rich brown. Legs stout and short; femoral tips and tarsi brown. Body hirsute. The dorsum is very transparent and shows the oil globules within the abdomen. These often are disposed in regular rows. Rostrum short. The young specimens are lemon yellow, with antennae twice the length of their bodies and with cornicles disproportionally large. Captured at Walthamstow in November." It appears to be a very rare species.

## Sub-tribe PHYLLAPHIDINA.

Only one genus occurs in this sub-tribe in Europe, namely *Phyllaphis* of Koch. Another genus *Neophyllaphis* Takahashi occurs in Japan and New Zealand (Laing), another *Shivaphis* Das in India and a fourth genus *Tamalia* Baker, in America.

This sub-tribe apparently comes between the *Thelaxini* and the *Callipterini*, but is placed by Baker in the latter.



## Genus PHYLLAPHIS Koch.

Koch, Die Pflanz., 248 (1857) ; Buckton, Mono. Brit. Aphid., III., 40, pl. XCV. (1881) ; Van der Goot, Tijds. v. Ent., LVI., 125 (1913) ; Baker, Bull. 826, U.S. Dep. Agri., 24 (1920) ; Swain, Univ. Calif. Publi., III., 1, 12 (1919).

Body with many wax glands. Cornicles almost rings, but now and then slightly raised on low cones. Antennæ of 6 segments, rather long and slender, with narrow oval sensoria ; very minutely hairy. Cauda markedly knobbed ; anal plate faintly divided. Venation normal. Males alate, rarely apterous. Oviparous females apterous. A single species only occurs in Great Britain, the *Aphis fagi* of Linnæus.

## PHYLLAPHIS FAGI Linnæus.

*Aphis fagi* Linnæus.

*Lachnus fagi* Kaltenbach.

Linnæus, Syst. Nat., II., 735, 28 (1735) ; Fn. Suec., 994 (1835) ; Reaumur, III., t. 26, fig. 1 (1736) ; Fabricius, Ent. Syst., IV., 214, 24 (1794) ; Syst., Rhyng., 297, 24 (1803) ; Kaltenbach, Mono. Pflanz., 147 (1843) ; Koch, Die Pflanz., 249, figs. 325, 326 (1857) ; Buckton, Mono. Brit. Aph., III., 40, pl. XCV. (1880) ; Walker, Ann. Nat. Hist., I., 5, 128, 6 (1848) ; Schouteden, Cat. Aphid., Belg., 209 (1906) ; Theobald, Rep. Eco. Zool. for 1912, 99 (1913) ; Rep. Eco. Zool. for 1913, 136, fig. 62 (1914) ; Swain, Univ. Calif. Publi. Ent., III., 1, 13, 2, figs. 9-12 (1919) ; Davidson, Journ. Eco. Ent., III., 376 (1910).

*Alate viviparous female.* Yellowish-green to green, often deep green, head dark, often with paler areas, especially two median lines ; thorax with black lobes ; abdomen with 7 black median bars and black lateral spots. Antennæ shorter than body, dusky, except basal area of segment iii. The flat cornicles black. Cauda and anal plate dark green to blackish. Eyes red. Fore and mid femora pale to deep green, apices dark ; hind femora all dark ; fore tibiæ pale, with dark apices ; mid and hind all dark ; tarsi deep green to black. Wings hyaline ; stigma grey, sometimes with greenish iridescence. Body covered with white waxy threads often much longer than body. Antennæ thin ; segment i. very little wider and no longer than ii. ; iii. nearly twice as long as iv., with 5 to 8 rather oval sensoria, usually in a line, but now and

then irregular; iv. about as long as v.; v. longer than vi., which has a very small blunt "nail." Rostrum rather short, reaching just beyond first coxæ. Cauda short and knobbed, constricted at base; hairs long. Anal plate bilobed, with long hairs.

*Length* 2 to 2.8 mm.

*Apterous viviparous female.* Yellow to bright green, with brown or deep green markings as follows: spots on pronotum in 2 rows of 4, 1 median one on dorsum of thorax and sometimes one on each side; 2 median spots on each abdominal segment and 1 each side of the segments. Eyes red. Antennæ about half length of body, yellowish-green, with dusky apices to iv. and v. and one-third to half of vi.; iii. longer than iv.; iv. very little longer than v.; vi. about same length, with a small "nail." Cauda small, cone-shaped. Legs yellow; apices of segments dusky; tarsi dark. Covered with long, flocculent white wool.

*Length* 2.5 to 3.2 mm.

*Oviparous female.* Apterous. Yellow, bright-green, yellowish-orange or dull-reddish, some are unicolorous, others show a dark spot on head, dark thoracic areas and a pair of spots on the middle of abdominal segments, which may merge into short dark bars, 10 in number and 8 pairs of dark lateral spots. Antennæ and legs dark brown to deep green, yellow at base. Cornicles as pores on a dark area. Cauda and anal plate deep green. Eyes

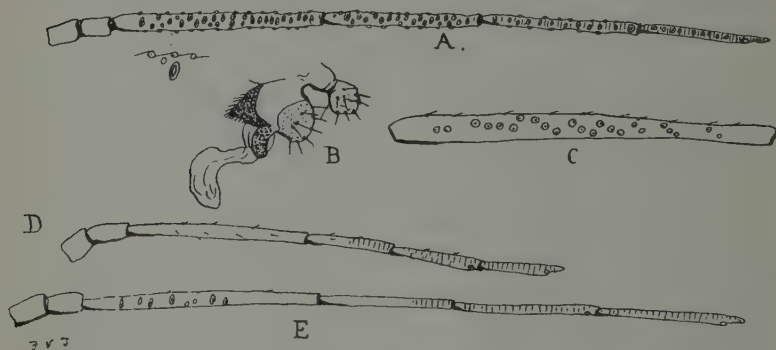


Fig. 178.—*Phyllaphis fagi* Linnaeus.

A. Antenna of male; B. External sexual organs of male; C. Hind tibia of oviparous female; D. Antenna of oviparous female; E. Antenna of alate female.

black. Legs yellow to yellowish-green, apices of tibiæ and the tarsi dusky. Antennæ not so long as body, thin, segment i. a little wider but shorter than ii. ; iii. twice or more as long as iv., often nearly as long as iv. + v. ; iv. about as long as v ; vi. a little shorter than v., with a small blunt " nail." Rostrum pale, short and thick, reaching to first coxæ ; apex hairy. Hind tibiæ not enlarged, showing many round sensoria (22 to 25) over most of its length, but not to apex.

*Length* 1.5 to 1.8 mm.

*Male.* Alate. Head dark. Thoracic lobes, shiny black ; a black spot on pleuræ ; bright orange between thoracic lobes and on the sides. Antennæ long, nearly as long as body, dark brown, pale at base of segments iii. and iv. Abdomen vivid green, with six median black transverse bars and darker green lateral spots and cross-bars. Legs dark brown. Wings large ; stigma greyish-brown. Segment i. of antennæ about same size as ii. ; iii. the longest, with many sensoria, some showing laterally ; iv. about as long as v., with 19 to 26 sensoria over whole length ; v. very little longer than vi., with 13 to 17 sensoria over whole length ; vi. with 9 to 10 in a line on one side, before the short, blunt " nail." Cauda dark, knob-like ; hairy. Anal plate dusky, hairy. Claspers conical, black. Penis long, curved, yellow, base darkened. Claspers with short stiff hairs.

*Length* 1.4 to 1.8 mm.

FOOD PLANT. Beech (*Fagus sylvatica*).

LOCALITIES. Common all over Great Britain. Europe generally and N. America.

*Observations.* This is a generally distributed insect over these islands, specimens having been taken or sent me from Scotland to Cornwall, in many parts of N. and S. Wales and from Ireland. In 1890 I found it in abundance in Guernsey. It often does a great deal of harm to Beech trees and hedges and is most noticeable on the Copper Beech. It occurs in the midst of large towns in as great abundance as in the country. It was abnormally abundant in 1912, reports of damage done being sent me from many parts of London and the suburbs, from Surrey, Kent, Hertfordshire, Cambridge, Worcestershire, Westmorland, Cumberland and Forfarshire. It was equally as bad or worse in

1913 and other records of damage were received from Aberdeen; Newmarket-on-Fergus, Ireland; Bristol; Newark; and many places in Sussex. Since then it has not appeared in such vast quantities. The insects, especially the apteræ and nymphæ produce a large quantity of white flocculent waxy wool-like material which passes well beyond the ends of their bodies and makes them appear much larger than they really are. By means of this wool they form a dense white mass beneath the leaves, which they kill. The leaves turn brown and shrivel up but as a rule do not fall. Buckton says that occasionally this excrement accumulates into resinous lumps which Walker refers to as being sweet. Swain refers to this insect in America. It is subject to much variation when alate, some have the dark abdominal bands as spots only, others have the bands almost confluent. The sexuales occur in October and November and I have found a few as late as December 12th on the dried leaves still hanging on the trees. The oviparous females lay from 8 to 17 eggs. It has been stated that these are placed at the base of the buds, etc., but all I have seen have been laid on the leaves, as a rule a single egg on each leaf. The ova are yellow when laid and are said to become black; all I have seen remained a dull yellowish-brown colour. They are covered with a fine fibrous substance or coarse meal and fixed tightly to the under side of the leaves. Some few were laid on the shoots. The ova hatch in April, usually about the first week and on to the end of the month. The young shelter as soon as they can in the unfolding leaves. They are at first very pale yellowish-green and long and narrow, like the apterous male (?) figured by Buckton; very soon white threads are produced. By May they become mature "Stem Mothers," covered with wool and from these nymphæ are produced which become alate viviparous females from mid May to July. These alatæ fly away, but where to we do not know. A few stunted apteræ alone remain and seem to exist until they are joined by the return migrants in September and October and on to November when we find apteræ, alatæ, oviparous females and alate males all together, often on the same leaf.

Buckton describes an apterous male (p. 39, pl. XCIV., fig. 5) taken in company with viviparous females, he says: "It is rather small and linear, bright green, rostrate and furnished with short and stout legs." I have only found alate males.

## Sub-tribe MONAPHIDINA.

This sub-tribe has been erected for a single genus *Monaphis* of Walker. It is separated from the other *Callipterini* by the cornicles being absent (vide table), otherwise it resembles the *Callipterina*.

## Genus MONAPHIS Walker.

*Bradyaphis* Mordwilko.

Walker, Zoologist, 2001 (1870); Mordwilko Varshava Universitetskii Izvestiia, VIII., 59 (1894); Baker, Bull. 826, 32 (1920).

Antennæ of 6 segments, without any distinct hairs; sensoria very small and round. Cornicles round, indistinct. Cauda rather rounded at apex, with an acute projection showing beyond anal plate; the latter strongly bifid. Wings normal. Type fixed by Walker (1870), the *Aphis antennata* of Kaltenbach. Baker is wrong in regard to the cauda, specimens of Walker's in the British Museum, examined by Mr. F. Laing (Ent. Mo. Mag., LIX., 244, 1923) and by myself in the National Museum of Ireland show it to be bifid.

## MONAPHIS ANTENNATA Kaltenbach.

*Aphis antennata* Kaltenbach.*Bradyaphis antennata* Mordwilko.

Kaltenbach, Mono. Pflanz., 88, 115 (1843); Walker, Ann. Mag. Nat. Hist., I., Se. 2, No. 5, 330 (1848); Zoologist, XXVIII., 2001 (1870); Laing, Ent. Mo. Mag., LIX., 244 (1923); Mordwilko, Varshava Universitetskii Izvestiia, 8, 59 (1894).

*Alate viviparous female.* Bright grass green, rather stout; eyes dark; antennæ dark, much longer than body; rostrum green, apex dark. Legs long, green, rather stout, hairy, apices of tibiæ and the tarsi dark. Wings much longer than body. Antennal segment i. larger than ii.; iii. a little longer than iv., with 37 to 42 small round sensoria on basal two-third; iv. and v. about equal; vi. very long. Rostrum rather short, not reaching to second coxæ. Cornicles small and truncate. Anal plate bilobed, hairy, also the cauda. Legs very hairy, especially posterior tibiæ, where they are dark and rather spine like.

*Length* 3.3 to 3.5 mm.

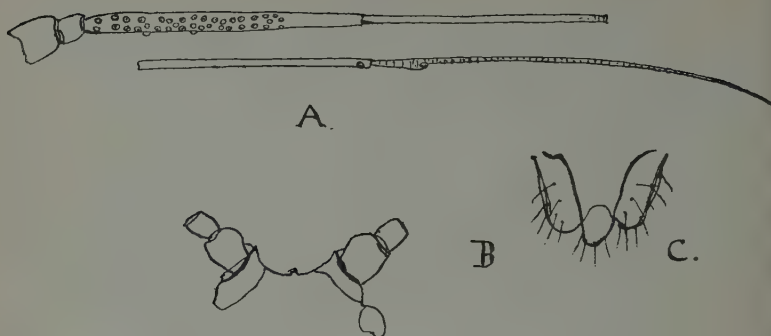


Fig. 179.—*Monaphis antennata* Kaltenbach.

A. Antenna of alate viviparous ♀; B. Head; C. Cauda and anal plate.

*Apterous viviparous female.* “Dark brown, broad, short, thick, elliptical, front slightly convex and very broad and there are no spines between the feelers; feelers black, stout and much longer than the body; first and second joints thick and dark-brown; third rather short; fourth as long as third; fifth a little longer than fourth; sixth about  $\frac{1}{2}$  length of fifth; seventh as long as third, fourth and fifth, together; legs stout, very short; shanks longer than thighs. In other characters it resembles winged female. Length 2 mm.

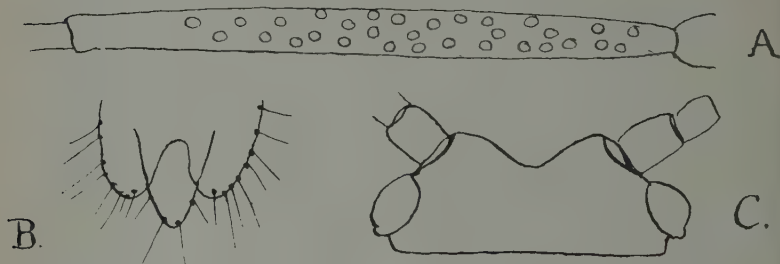


Fig. 180.—*Monaphis antennata* Kaltenbach.

A. Hind tibia, oviparous ♀; B. Anal plate and Cauda; C. Head (Laing).

*Male.* Winged. Scarlet; like the winged female but smaller and having a rather narrow front; the eyes also are more prominent than those of the female; the mouth has a black tip and reaches to the base of the middle legs; the lobes of the chest, the breast



and the sexual parts brown. In one insect the second fork of the third-branch-vein in one wing is twice the length of that in the other wing. *Length*  $1\frac{1}{4}$  line." :

*Oviparous female.* This has been figured by Laing and his figure is reproduced here.

FOOD PLANT. *Betula alba.*

LOCALITIES. England (Walker) ; Germany (Kaltenbach) ; Russia (Mordwilko).

*Observations.* Apparently a rare species and this description is drawn up from Walker's specimens in the Dublin Museum. Walker found the *alatae* in August. Mr. Laing has given notes on Walker's specimens in the British Museum (*Ent. Mo. Mag.*, LIX., 244 (1923).

## ADDENDA

### APHIS COMES Walker.

Ann. Mag. Nat. Hist. I, No. 4, Se. 2, p. 258 (1848).

Walker described an Aphid under this name found in August and October. Mr. F. Laing says this insect belongs to *Euceraaphis* and that it is probably only a form of *betulæ*. The host plant was *Betula alba*. The type does not exist.

### APHIS WILSONI Laing (p. 181).

*Male*. Alate. Dorsum; head and thorax black; abdomen dark green; antennae brownish-black; legs dirty greyish-brown, distal end of femora and tibiæ distinctly darker, as well as the tarsi. Cornicles dark green to brownish-green. Venter; proboscis dirty greyish-brown; abdomen dark green; coxæ, femora and tibiæ black. Antennæ about as long as body, thick; segment i. wider but no longer than ii.; iii. longer than iv., about as long as the flagellum of vi., with 47-53 round pale sensoria, of unequal size; iv. about as long as v. with 36-40 sensoria; v. with 19-21 sensoria; base of vi. more than half of v.; flagellum not quite three times length of base. Rostrum reaches to third coxæ, acuminate. Cornicles thin, straight, not so long as segment iv. of antennæ, finely imbricated. Claspers and penis dark. Eyes large. Some specimens show *Toxoptera* venation.

*Length* 1.3 to 1.5 m.m.

*Oviparous Female*. Apterous. Ovoid. Antennæ slightly more than half the length of body; i. and ii. dark, also apex of v. and all vi.; i. wider than ii.; iii. longer than iv., equal to the flagellum; iv. and v. equal, about as long as vi.; base of vi. about two-thirds of v. and half flagellum; imbricate. Rostrum reaches to or past third coxæ, rather broad. Cornicles rather thick and large, dark, cylindrical, enlarging at base, about as long as antennal segment vi., imbricate. Cauda short and blunt, with several fine curved hairs, a little more than one-third of cornicles.

Anal plate rather large and rounded, with long, very fine hairs. Legs rather short and thick, with many short, stiff, dark hairs; hind femora not enlarged and do not show any sensoria. Lateral abdominal papillæ as in viviparous female, the posterior pair being very large.

*Length* 1.5 to 1.8 mm.

Some show one, others two ova.

The specimens were taken by Captain J. Davidson at Cambridge (x. 1925) on the lower stems of *Dianthus* and by Mr. Hodson on *Saxifraga* roots at Paignton, S. Devon (14 vi. 27). With the oviparæ and males found at Cambridge were some apterous viviparous females.

*APHIS EPIPACTIS* sp. nov.

*Apterous viviparous female.* Very dark green, almost sooty black when alive; antennæ pale, except at base and apex; legs pale, apices of femora and tibiæ dusky; tarsi dark. Cornicles and cauda dark. Eyes black. Antennæ shorter than body; segment i. wider than ii.; iii. longer than iv., about as long as flagellum of vi., with three hairs one side, two the other; iv. very little longer than v. three hairs one side, two the other; v. with two hairs one side and two below the primary sensorium, apical area dark from sensorium to apex; vi. with base three-quarters of v., dark; iv. to vi. imbricate. Head rounded in

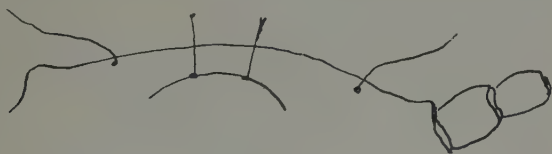


Fig. 181.—*Aphis epipactis* sp. nov.

Apterous ♀. Head showing marked frontal hairs.

front, a large hair each side and two furcate ones in the middle. Cornicles thick, cylindrical, about as long as segment iv. of antennæ, much thicker, imbricate. Cauda as long as cornicles and a little thicker, with several long apically curved hairs. Legs moderately long, rather thick; femora and tibiæ with numerous rather long hairs, some of the tibial hairs longer than width of joint. Pronotal papillæ present, but the specimens show no trace of lateral abdominal papillæ.

*Length* 1.2 to 1.4 mm.

FOOD PLANT. *Epipactis palustris*.

LOCALITY. Glamorgan, Penarth, 24 vii. 27 (H. M. Mallett).

*Observations.* Described from two apteræ with one larva mounted by Mr. Laing. The species is very distinct owing to the cephalic hairs. *Type* in the British Museum (N.H.).

APHIS BREVISIPHONA Theobald (p. 203).

*Male.* Alate. Antennæ shorter than body; segment i. wider than ii., no longer; iii. rather thick, considerably longer than iv., with 43-48 sensoria all over it, right up to apex, of unequal size; iv. with 16-18 small sensoria up to apex, mainly on one side, longer than v.; v. with 14-20 sensoria all over it; base of vi. rather more than half the flagellum. Rostrum to second coxæ. Head and thorax dark. Abdomen dark, with deeper coloured transverse bars and lateral spots and short scattered hairs. Cornicles dark, short, cylindrical, imbricate, shorter than base of segment vi. Cauda dark, about as long as the cornicles, with several hairs. Claspers small; penis apparently short. Two small dorsal papillæ on the penultimate segment. Wings normal.

*Length* 1.4 to 1.6 mm.

FOOD PLANTS. *Matricaria* and *Chenopodium*.

LOCALITY. Wye, 7-14 iv. 01.

I had overlooked these males in my collection as they were mounted with some alate viviparous females. They appeared to be numerous. This is a strange time for sexuales to appear. There is clearly no mistake in the date, as the slides, tubes and notes all agree.

APHIS DAVIDSONIELLA sp. nov.

*Alate viviparous female.* Black; stoutly built; abdomen a little paler than thorax and faintly showing dark cross-bars and lateral spots; antennæ, cornicles, cauda and anal plate black; legs dark, fore femora and middle of all tibiæ paler. Antennæ shorter than body; segment i. wider but no longer than ii.; iii. very little longer than iv., with 9-14 small round sensoria more or less in a line along one side; iv. a little longer than v.; vi. about as long as iii.; flagellum about one and a half as

long as base ; base of vi. a little more than half of v. ; iii. to vi. well imbricated. Rostrum rather short and thick, scarcely reaching second coxæ. Cornicles rather thick, cylindrical, slightly longer than base of vi., imbricate. Cauda as long as cornicles, thicker, with numerous apically curved hairs, spinose. Body with numerous short hairs. Cleared specimens show dark bars on abdomen and dark lateral spots, a dark area between the cornicles and a dark transverse bar in front of anal plate. Lateral papillæ small. Legs hairy. Wings normal. The imbrications on cornicles as dotted lines.

Length 2.5 to 3 mm.

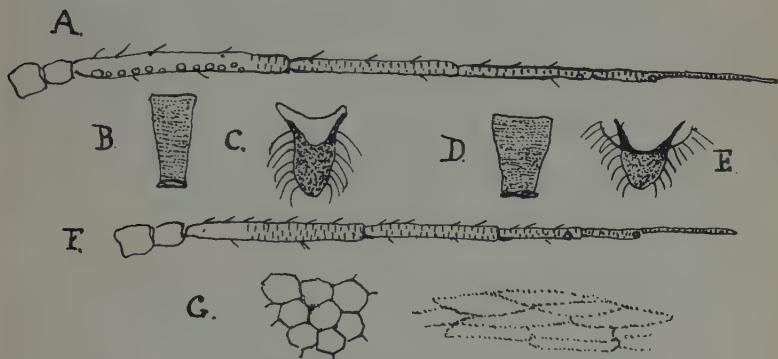


Fig. 182.—*Aphis davidsoniella* sp. nov.

A. Alate ♀ antenna ; B. Cornicle ; C. Cauda ; D. Cornicle of apterous ♀ ; E. Cauda ; F. Antenna ; G. Body sculpturing.

*Apterous viviparous female.* Black. Antennæ, cornicles, cauda and anal plate black. Legs dark, tibiæ paler in middle. Antennæ shorter than body ; segments i. and ii. very dark ; i. larger than ii. ; iii. longer than iv., about as long as vi. ; iv. a little longer than v. ; base of vi. more than half of v. ; flagellum one-and-a-half times base of vi. ; iii. to vi. imbricate ; with a few short stiff hairs ; base of vi. three-quarters of v. Cornicles short and thick, a little shorter than segment v., imbricate, expanding basally ; imbrication dotted. Cauda thick and blunt, a little wider than cornicles at their base, with numerous apically curved hairs ; spinose. Anal plate black, spinose, with a few hairs. Skin with irregular hexagonal reticulation on body ; between the cornicles to the apex the reticulations elongate, marked with spotted outlines. Cleared specimens show dark

transverse median abdominal bars and large dark lateral spots ; area between cornicles dark and a dark bar before the anal plate. Lateral processes small ; short, stiff, hairs over abdomen. Legs rather short and thick, with numerous hairs, especially on the tibiæ, the hairs variable in length.

*Length* 2.5 to 3 mm.

FOOD PLANT. *Rumex*, feeding in flower spikes.

LOCALITIES. Harpenden, 20 vi. 27 (Davidson) ; Aberystwith (Jenkins).

*Observations.* Described from a number of specimens in all stages. It resembles in general appearance *A. rumicis* Linn., but the cornicles and cauda are much larger and stouter and are about the same length. From the black *Aphis brevisiphona* Theo. which it also superficially resembles it may be told by its larger size, much thicker cornicles, blunter cauda in the apteræ and in the alate ♀♀ by antennal segment iv. being longer than v., not of equal length as in *brevisiphona*.

The APHIS URTICÆ of Linnæus, Fabricius and Schrank.

In 1758 Linnæus described an *Aphis urticæ* (Syst. Nat. Ed. x. 453, 25) as follows: "A. urticæ, alba lanata postici truncata *Frisch* Ins. 8 p. 34 t. 17. *Habitat in Urtica germaniæ* P. Forskål. *Inter maximas hujus generis, tota alba, oblecta quasi setis ; subtus vero lana alba, postice valde obtusa ; de genere haereo, utrum ad Aphis aut Chermes accedat.*"

In 1794 Fabricius described an *Aphis urticæ* (Ent. Syst. iv. 217. 35) as follows: "Corpus nigrum abdomine obscure aeneo. Corniculi breves. Anus terminatur stylo brevissimo, truncato. Alæ albæ, venis parallelis nigris costaque fusca. Pedes nigri. *Habitat urticæ dioicæ caulibus foliis.*"

In 1801 Schrank (Fauna boica. ii. 106, 1186) described an *Aphis urticæ* as follows: Wohnort ; aus den Blättern der grossen Nessel. *Ann.* Ziemlich gross, verkeht eyformig ; grün, langfüssig ; die Fühlerhörner länger als der Körper, blass, über die Hälfte schwarz ; der Saugrüssel kurz ; die Füsse blass ; die Enden schwarz ; die saftspizen blass, länger als der Saugrüssel ; das Afterschwanzchen fadenformig, viermal Kürzer als die Saftspizen."



The last is clearly the common Nettle *Macrosiphum* and is now generally known as *Macrosiphum urticae* Schrank. The name *urticae* was preoccupied by Linnæus and Fabricius. The question is what are Linnæus' and Fabricius' *urticae*? In my opinion it is impossible to say from the descriptions; the "postice truncata" does not point to a *Macrosiphum*. Fabricius' *urticae* has "corniculi breves; stylo brevissimo," obviously not a *Macrosiphum*. It has been suggested that Kaltenbach's *urticaria* is Fabricius' *urticae* but *urticaria* has not "corniculi breves." Could Fabricius' *urticae* be Laing's *stanilandi*, a *Pergandeida*, obviously not for in *Pergandeida* the style is not "brevissimo," although the cornicles are "breves."

To the writer it seems impossible to say to which of the three nettle Aphides (*Macrosiphum urticae* Schrank, *Aphis urticaria* Kaltenbach and *Pergandeida stanilandi* Laing), Linnæus' and Fabricius' description could apply with any degree of precision. Linnæus' description *might* possibly be made to apply to *urticaria* or to *stanilandi*, but Fabricius' to neither so far as the writer can see. With the exception of Rymer Roberts' record of *urticae* Fabricius in 1915 (Lancs. and Chesh. Naturalist, ix. 280) which was *urticaria* Kaltenbach, I know of no mention of Linnæus' or Fabricius' *urticae* in recent years. Linnæus' *urticae* does not appear in any Aphid list.\*

The APHIS PADI of Linnæus.

Reaumur in his Insects (Pl. 23, figs 9 and 10) figured two Plum (prunier) aphides; figure 9 is the Mealy Plum Aphid (*Hyalopterus pruni* Fabr.); the other (fig 10) the Leaf-Curling Plum Aphid (*Anuraphis helichrysi* Kalt.). Linnæus (Syst. Nat. Ed. x. 734, 8) gave these the name *Aphis padi* and added a food plant *Prunus padus*.

Fabricius described the first of Reaumur's insects as *Aphis pruni* and just before it the form on the Reed as *Aphis arundinis*. This latter name has precedence. This leaves Reaumur's Leaf Curling Plum Aphid, which is now known as the *Anuraphis helichrysi* of Kaltenbach. Linnæus' name *padi* then falls to the latter insect and Kaltenbach's name becomes a synonym. Schrank's, Walker's, and Mordwilko's *Aphis padi* Linnæus, brown insects,

\* Schrank's *Macrosiphum urticae* must have a new name and I propose *M. schranki*.

are thus clearly not the *padi* of Linnæus (the green aphid of Reaumur) and can be traced to the *Aphis infuscata* of Koch.

The *Aphis padi* of Kaltenbach and Van der Goot—green insects—are evidently the *Aphis avenæ* of Fabricius, which is found in *Prunus padus*. Fabricius merely lists the *Aphis padi* of Linnæus. Koch describes and figures *Aphis padi* Linnæus from *Prunus padus* (p. 110, figs 147, 148). This is evidently quite a distinct species, which I have failed to find. It is very marked, the apterous ♀ being pale yellowish-green, a line of green spots each side and a median green line, yellow and orange around the cornicles, the latter yellow with black apices and the cauda olive-brown to black and with nine pairs of small lateral papillæ. The alate ♀ with black head and thorax, deep green abdomen, with a deeper green line each side and in the middle; four black spots each side and one at base of each cornicle; cauda and cornicles black.

Koch gives Schrank's *padi* as a reference, this, as previously stated, is a dark brown insect, clearly Koch's *infuscata* which I have from *Prunus padus*, *P. spinosus* and *P. insititiæ*.

In conclusion, it seems to me that Linnæus' *padi* is Kaltenbach's *helichrysi*; Kaltenbach's *padi* Linnæus' and Van der Goot's are the *avenæ* of Fabricius—a green insect, whilst Schrank's, Walker's and Mordwilko's brown *padi* are Koch's *Aphis infuscata*.

#### APHIS SOLANINA Passerini (vide p. 166).

This sinks under Boyer's *Aphis rhamni* (p. 199) with Miss Patch's *Aphis abbreviata*. Elze (De Verspreiding van virus-ziekten van de Aardappel (*Solanum tuberosum* L.) door insekten 1927) shows that spring migrants of *A. rhamni* are successfully transmitted from *Rhamnus catharticus* to the potato and fall migrants of *A. solanina* from potato back to *Rhamnus catharticus*. I have traced the same this year at Wye. The synonymy of *A. rhamni* thus stands:

*Aphis rhamni* Boyer. 1841.

*Aphis solanina* Passerini. 1863.

*Aphis abbreviata* Patch. 1912.

Miss Patch had previously suggested that *solanina* was the same as *rhamni*.

## APHIS OCHROPUS Koch (p. 155).

In the alate viviparous ♀ there is one pair of large lateral papillæ on the pronotum and a large pair on abdominal segment six ; characters not mentioned in my description.

## ANURAPHIS CRITHMI Buckton.

*Aphis crithmi* Buckton.

Trans. Ent. Soc., Lond., pt. iii. 323 (1886).

The following is Buckton's description and some notes from his slide in the British Museum are appended.

" *Alate viviparous female*. Lemon yellow, head black ; thorax with a broad interrupted discoidal brown or black spot ; a similar square spot on the abdomen, between the cornicles, with two or more luteous dashes, four carinal spots each side. Eyes red. Antennæ black. Rostrum to 3rd coxæ. Knees and tarsi dark brown. Wing insertions yellow, also the stigma. Body 0.080 × 0.030 inch.

" *Apterous viviparous female*. Small, oval, brown, slightly mealy to the naked eye. Neck ring, cornicles and two or more irregular patches on each side the abdomen, dark olive-green or brown. Abdomen pilose and pitted near the carina. Eyes black. Antennæ greenish and about two-thirds length of insect.

" Young individuals are often bright yellow or greenish, with numerous minute spots dotted over the surface.

" The *pupa* is of a drab-yellow colour, with black head, eyes, nectaries, knees and tarsal joints. Wing coverts yellow, tipped with black."

FOOD PLANT. Sea Samphire (*Crithmum maritimum*).

LOCALITY. Kingsbridge Devonshire (July).

*Observations*. I have never found this species. Buckton's slide of it is in the British Museum, labelled  $\frac{BI}{2}$  and contains two alate ♀♀, two nymphæ, one immature apterous ♀ and four larvæ. The insects are so badly mounted and fogged that one can make little of them. The antennæ of the *alate female* are much shorter than the body ; segment iii. is as long as iv. + v. and has many sensoria ; iv. about one-third longer than v., with several sensoria ; base of v. about two-thirds of v ; flagellum

about as long as iii., cornicles short, nearly as long as segment v., constricted at base. Cauda a little shorter than cornicles. In the apterous ♀ segment v. of the antennæ about equals base of vi.; flagellum about four times the short, thick base. Cornicles short, cylindrical, longer than antennal segment v. and longer than the cauda.

The fogged appearance of the specimens make it impossible to give all the essential characters. It is a typical *Anuraphis*.

*ANURAPHIS MASSEI* sp. nov.

*Alate viviparous female.* Described from potashed specimens. Antennæ dark, nearly as long as body; segment i. wider and a little longer than ii.; iii. longer than iv., much shorter than flagellum of vi., with 57 to 60 sensoria, some oval, some round; iv. longer than v., with 14-20 sensoria, some oval, some round; v. with 2 to 5+1; base of vi. about half of v.; flagellum long, longer than iv. + v. + base of vi. Rostrum reaches nearly to or just past second coxæ. Head and thorax dark. Abdomen with a dark irregular area at base, a large dark area extending past the cornicles and dark lateral spots; short hairs on body; no apparent lateral papillæ; six marked hairs on apical segment. Cornicles dark, cylindrical and rather thick, longer than antennal segment v., imbricate, slightly narrowing apically. Cauda and anal plate dark; cauda small, blunt, scarcely projecting beyond anal plate, about as long as base of antennal segment vi.; three hairs each side; anal plate rounded with several long hairs. Legs long, coxæ and trochanters dark; femora dark, except just at base; tibiæ pale, apices dusky; tarsi dark. Wing venation normal.

*Length* 1.5 to 1.9 mm.

*FOOD PLANT.* *Prunus tomentosus*.

*LOCALITY.* East Malling 11 vi. 25 (Massee).

*Observations.* Described from four alate ♀♀ and three nymphæ mounted by Mr. F. Laing. The flagellum of the antennæ is markedly long. The insects were collected by Mr. A. M. Massee.

*Type* in the British Museum (N.H.).

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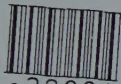




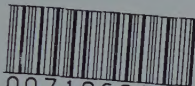


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